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FOOD Manufacture

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP

Vol. 36 No. 5 MAY 1961

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- always out in front...

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BUSH

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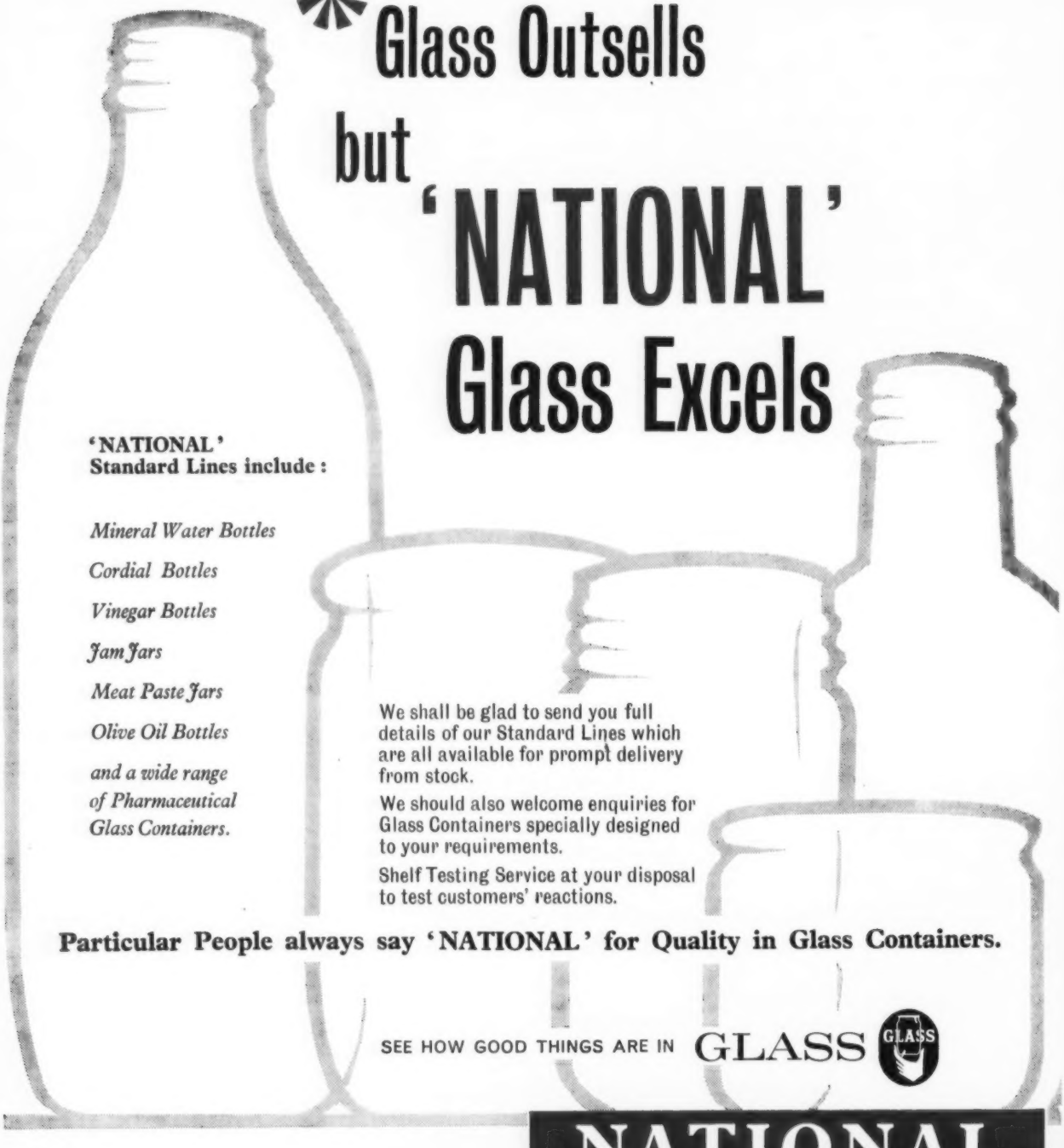

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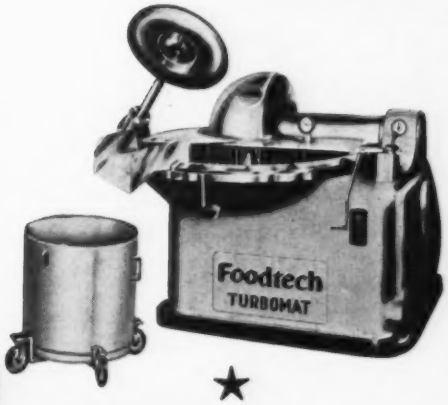

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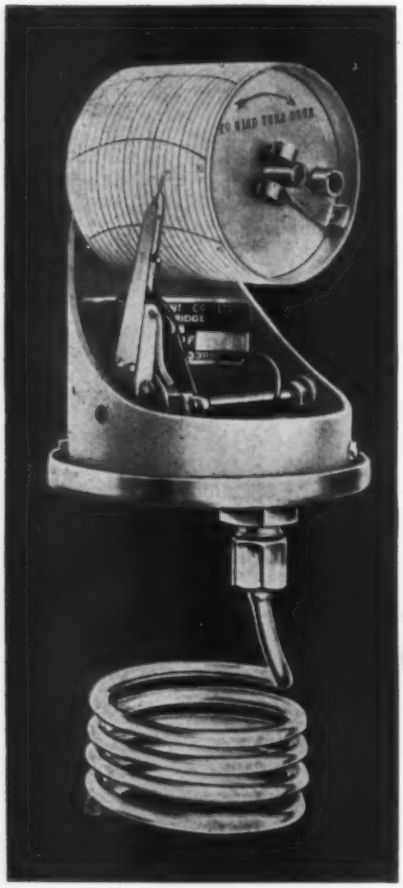

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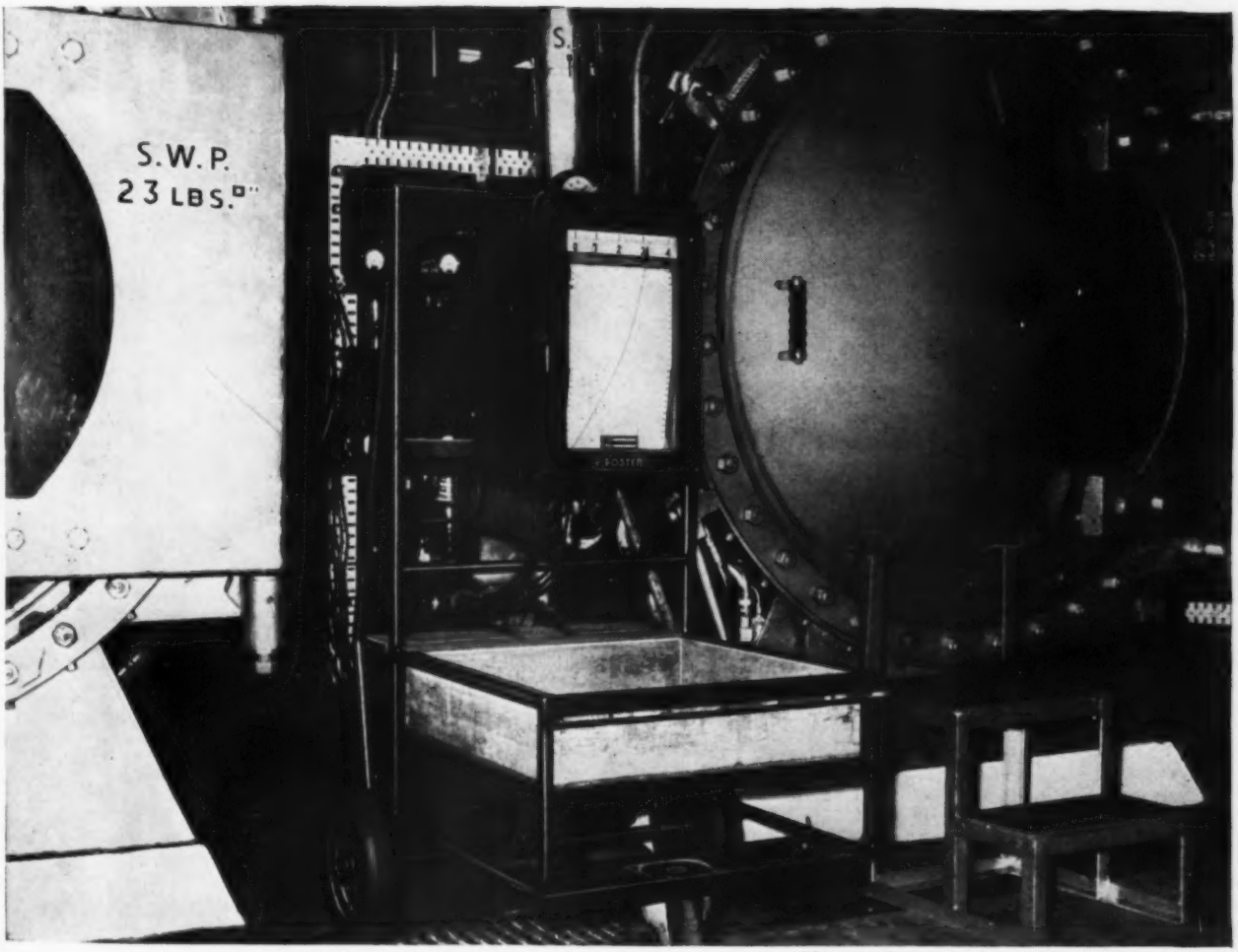

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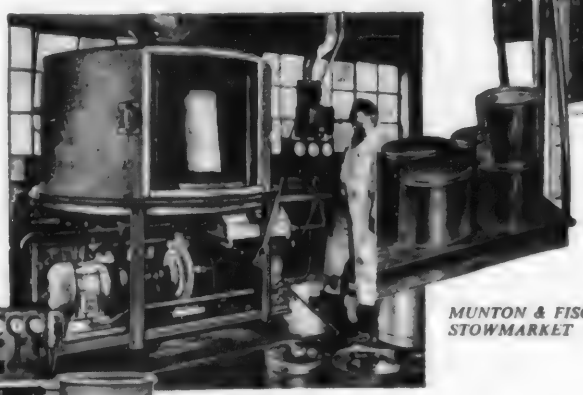

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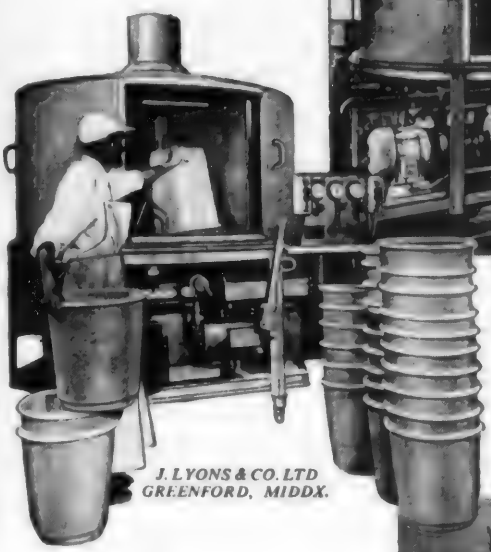

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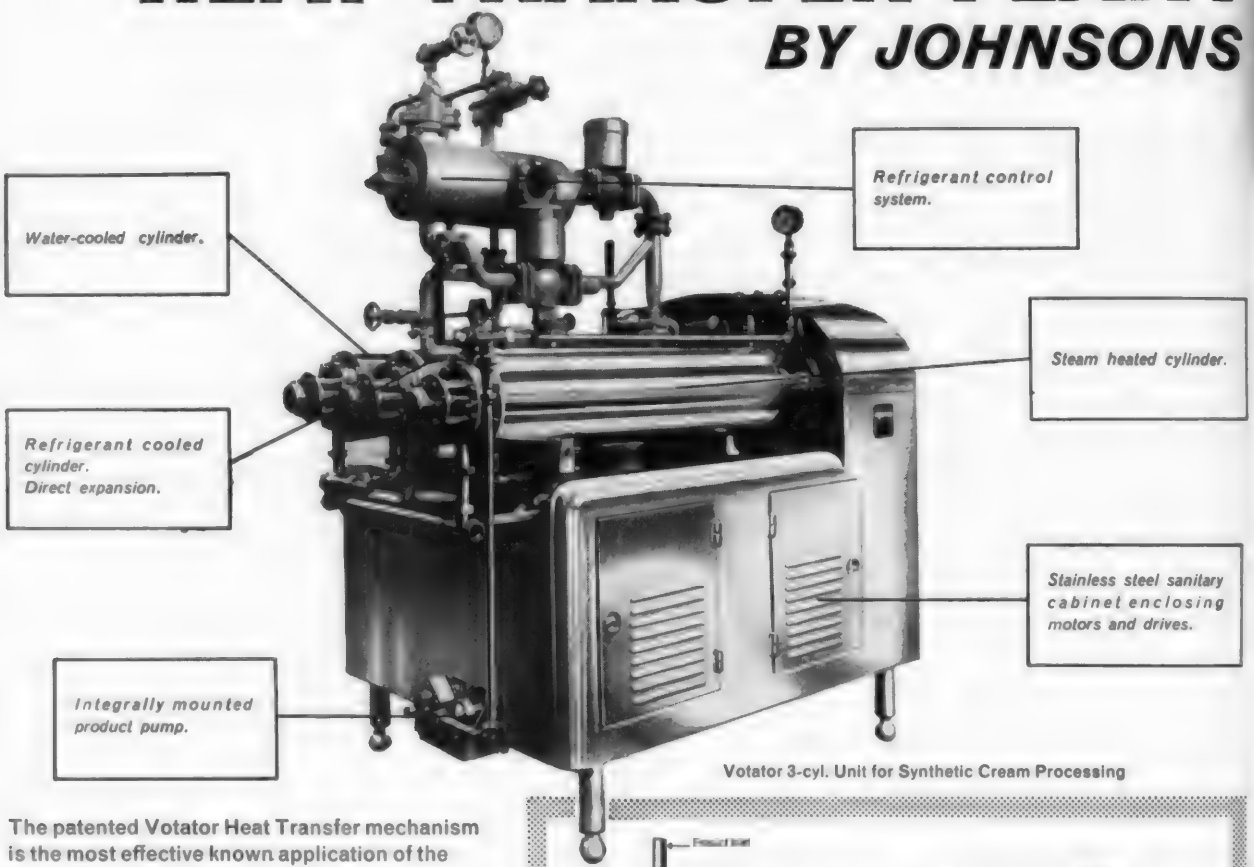
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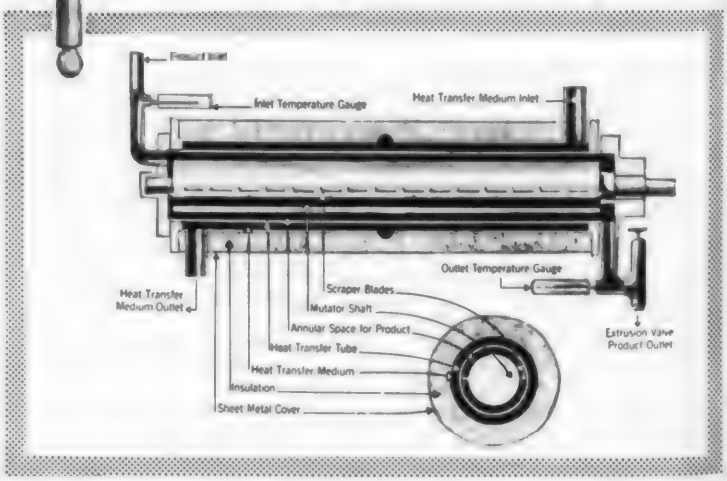

VOTATOR SYSTEMS HAVE THIS HEAT TRANSFER MECHANISM

This mechanism provides a large heat transfer area in relation to the volume of material being treated. It maintains that very desirable balance by constantly scraping the heat transfer surface clean.

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The Baker Perkins group of companies is concerned with food production in its widest sense. The group supplies complete and automatic plants and there is hardly a single aspect of the food industry in which it does not make its highly qualified and experi contribution, from ingredients handling right through to packaging.

1

This 100-ton [illegible] at its Research [illegible] Manchester [illegible] Baker Perkins [illegible] Bread [illegible] all [illegible] conveyors [illegible]

2

At Macfarlane Lang and Co. Ltd., Baker Perkins have installed [illegible] for handling [illegible] tailor-made [illegible] Paper [illegible] Biscuits [illegible] Biscuits are [illegible] delivered [illegible] to [illegible] in pre-determined quantities.

3

A series of [illegible] water installations [illegible] Alfred Bird & Sons Ltd. [illegible] Baker Perkins [illegible] Douglas [illegible] Plants are [illegible] water for [illegible] the manufacturing [illegible] including recovered [illegible]

4

A battery of flour and sugar [illegible] in the [illegible] at [illegible] Ltd. at [illegible] is part of an extensive bulk handling installation for flour, sugar, fat, water, syrup and malt.

AT EVERY STAGE OF AUTOMATIC FOO

3

A series of Alfloid water installa-
[illegible] manufactured by Alfred
[illegible] a company in-
[illegible] Alfloid Douglas.
[illegible] installations are
[illegible] have been sup-
[illegible] Alfloid water for
[illegible] manufacturing
[illegible] including jacketted
[illegible].

4

A battery of flour and sugar weighers in the dispensing floor of Macfarlane Lang & Co. Ltd. at Osterley. This is part of an extensive bulk handling installation for flour, sugar, fat, water, syrup and malt.

5

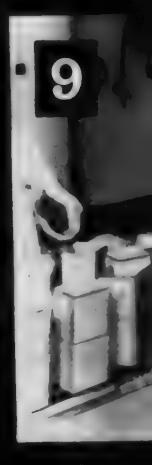
A section of the main control panel at William Macdonald & Sons (Blairhall) Ltd., Glengarry Biscuit Bakery, Glasgow. The mimic diagram of the bulk handling plant shows the state of distribution of ingredients at a glance.

6

Part of the mixing room at Macdonalds, Glasgow. The entire mixing operation is automatic and is controlled from recipe desks. These high speed mixers feed directly to dough feeder hoppers on the bakery floor.

7

Five [illegible] Perkins [illegible] temperi[illegible] cream [illegible] C & [illegible] (Livers[illegible] Ltd.) [illegible] Kuhn de[illegible]



FOOD PRODUCTION

7

Five lines of Baker Perkins direct fired high temperature ovens in the cream cracker block of W. & R. Jacob & Co. (Liverpool) Ltd. Each line is fed by **Baker Perkins** dough laminators.

8

Automatic biscuit handling. This lapper stacker at Jacobs, Liverpool, blends the output of the cream cracker plant into a uniform single column, stacked ready for feeding automatically into wrapping equipment.

9

A Rose H.S.C. Machine at [illegible] Limited [illegible] mounted [illegible] are [illegible] rotating [illegible] or [illegible] rupt [illegible] marry [illegible] the [illegible] cartons [illegible]

10

A complete packaging plant [illegible] Equipment includes [illegible] for carton forming and erecting, carton sealing and carton overwrapping. The machines are linked by conveyors for [illegible] handling [illegible]

for the

complete

answer
to every aspect of
biscuit production

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* Automatic co
* Process cont
* Continuous a batch mixing
* Dough feedin laminating
* Cutting and
* Moulding
* Depositing
* Baking
* Cooling and
* Automatic biscuit handl
* Wrapping
* Packaging pl
* Enrobing and sandwiching
* Automatic wafer produ

consult BAKER PERK

BAKER PERKINS LTD. Westwood Works Peterborough

age

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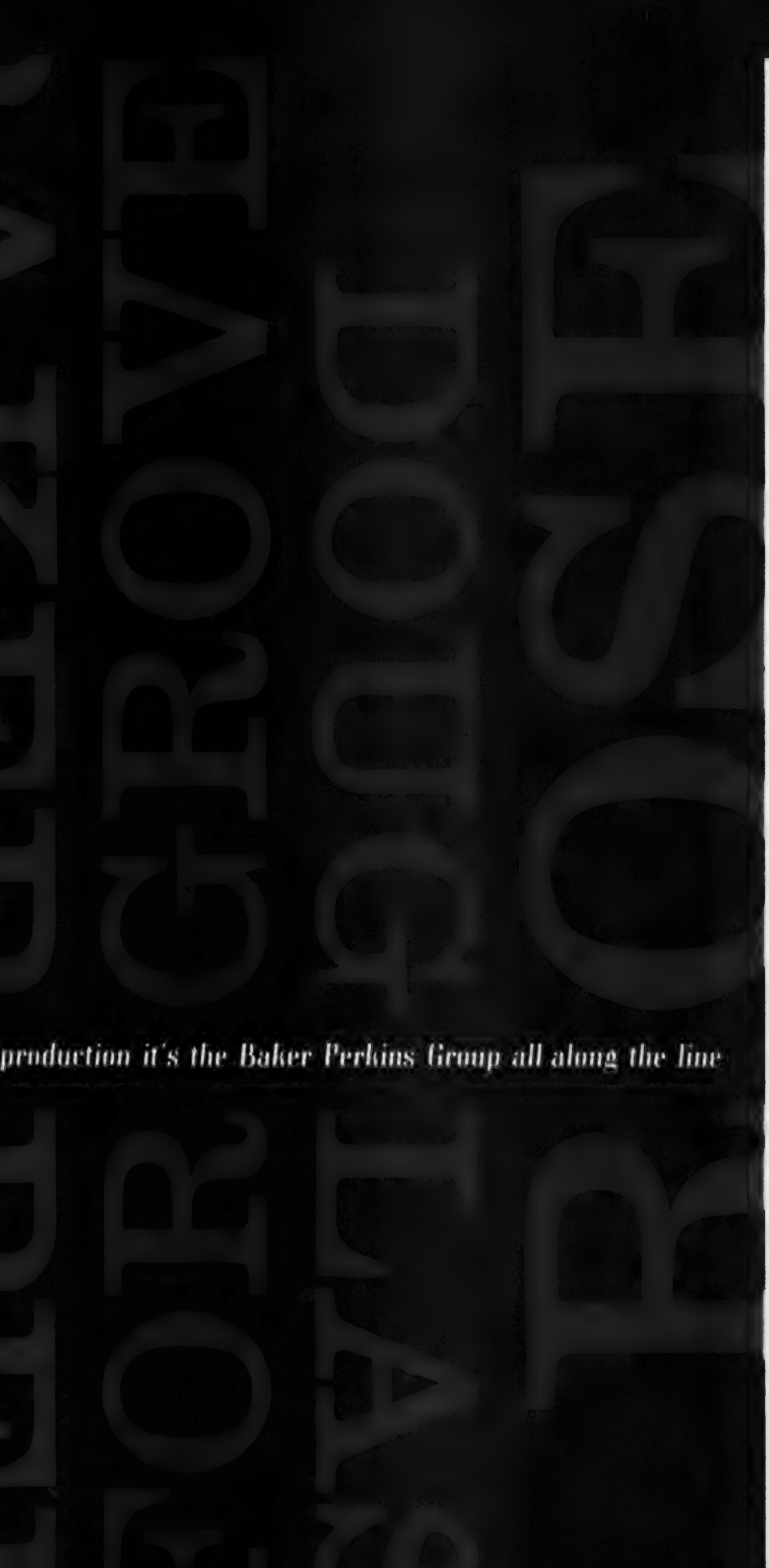
for automatic food prod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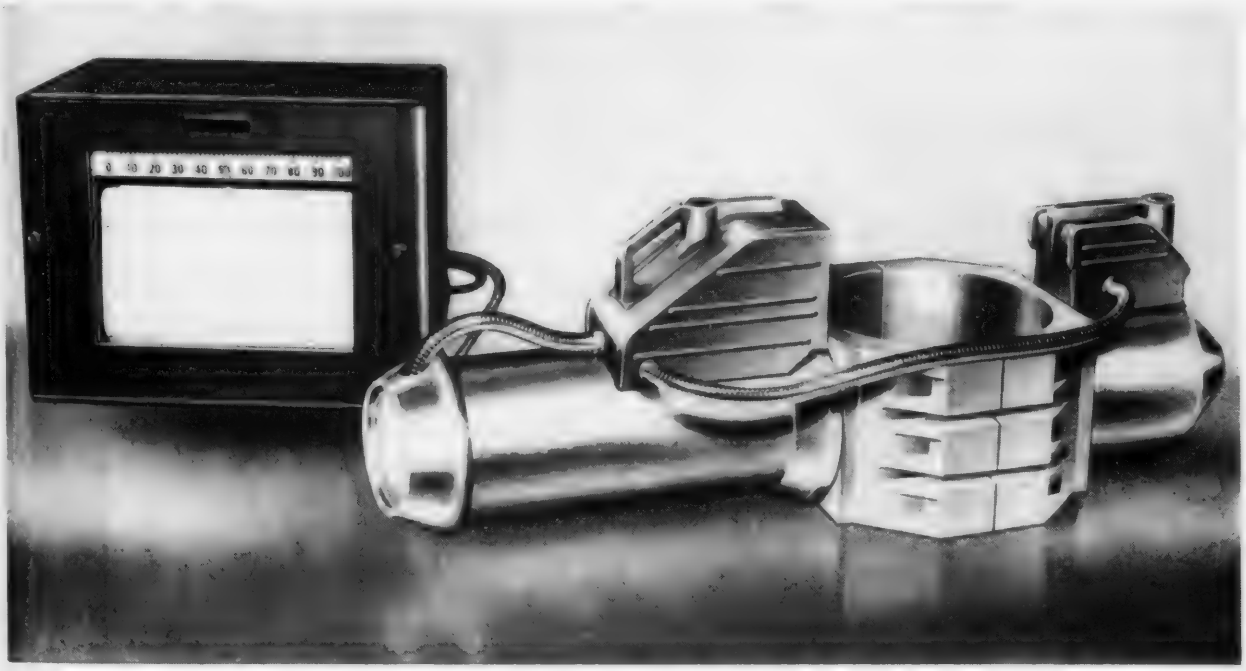

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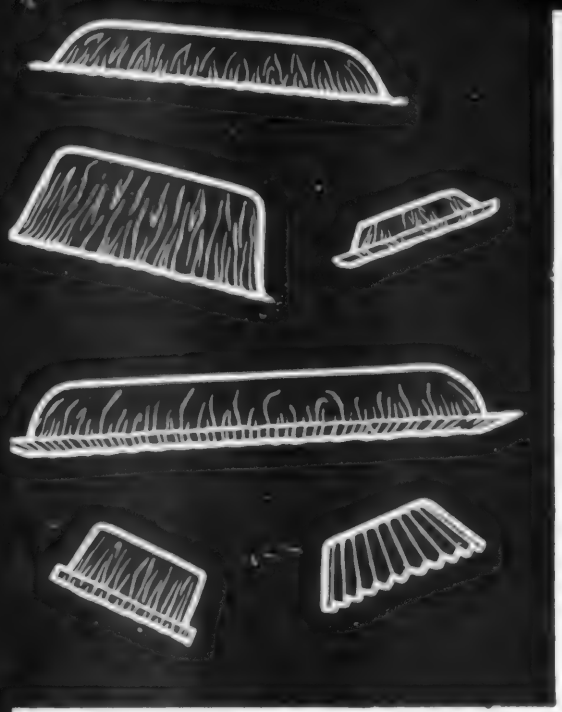

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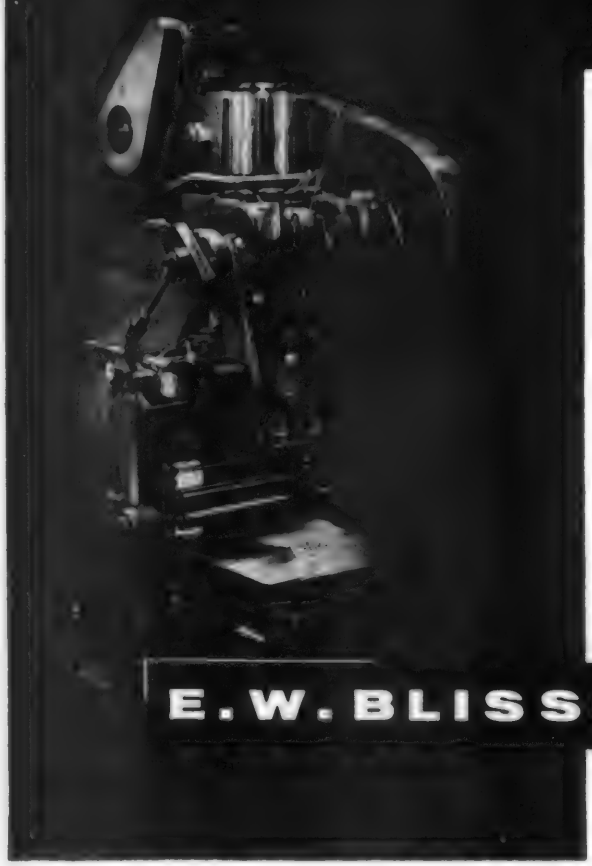

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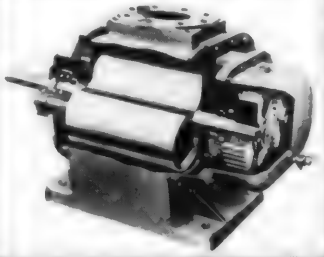

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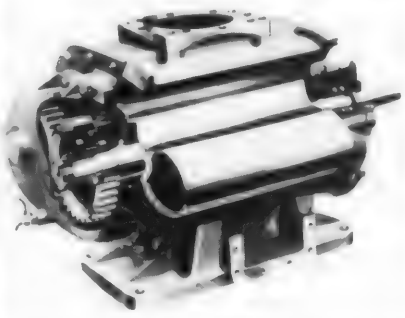

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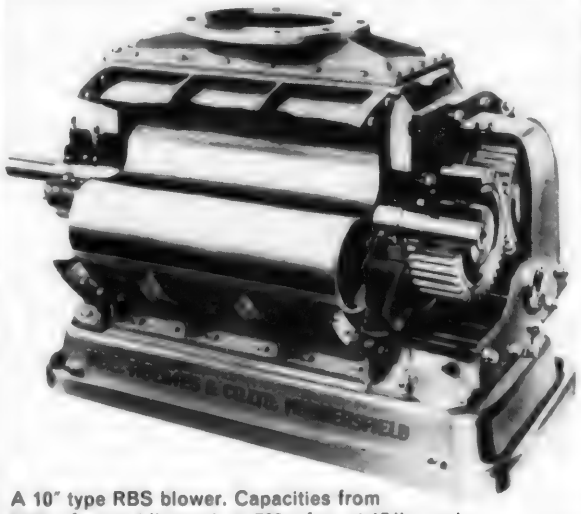

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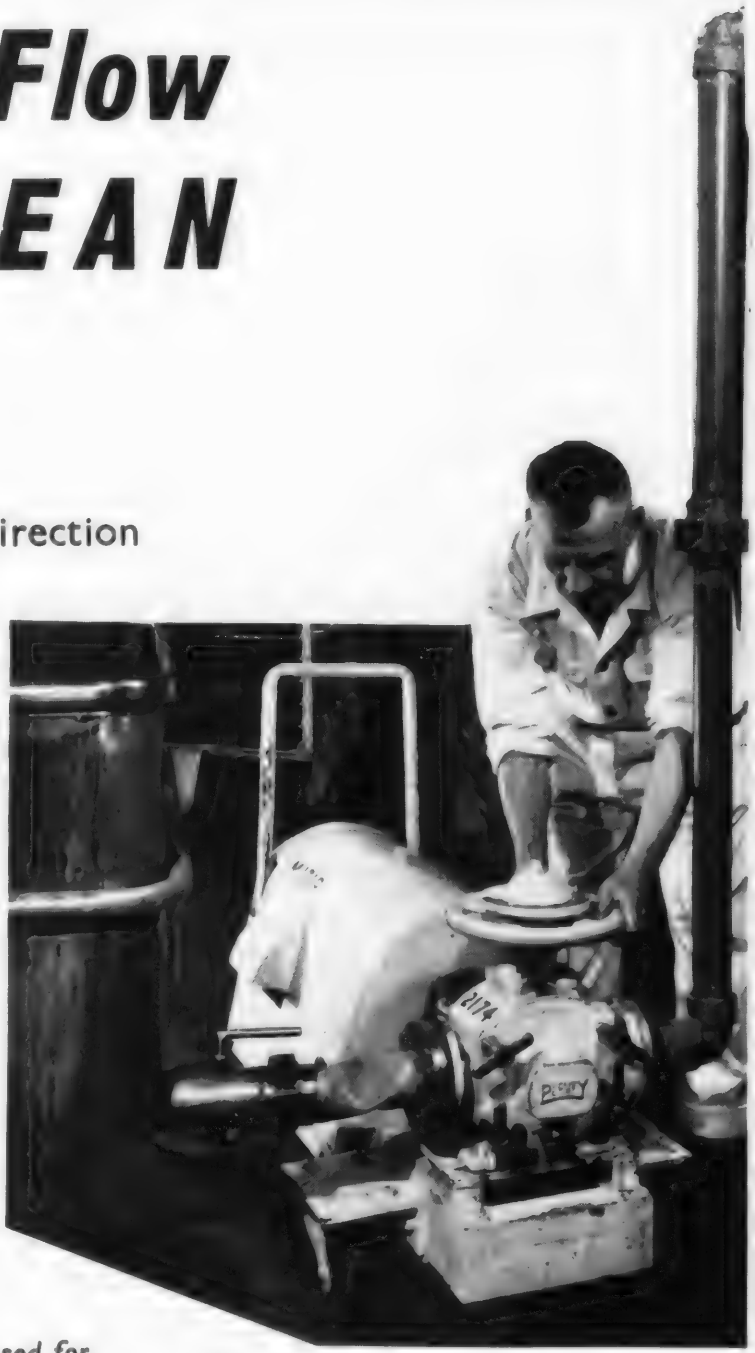

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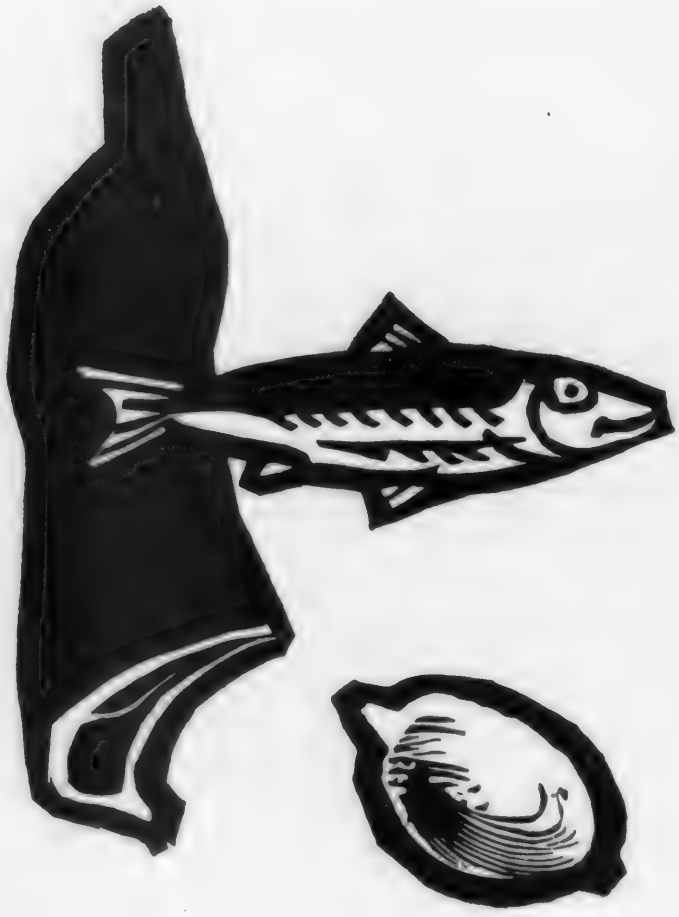

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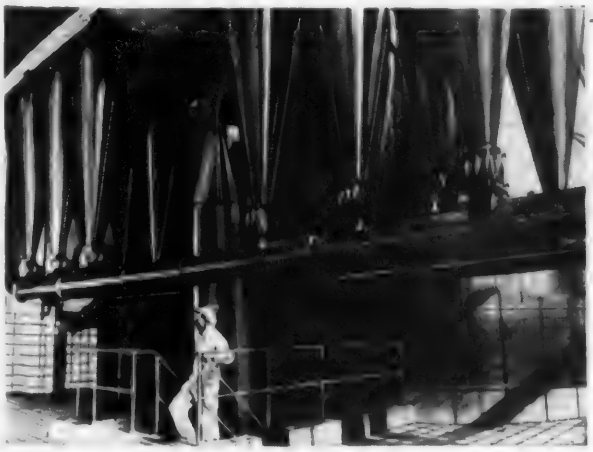

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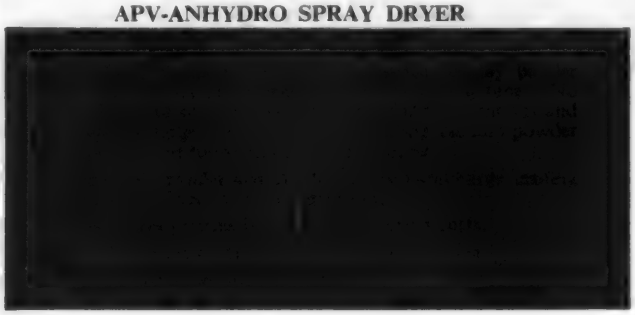

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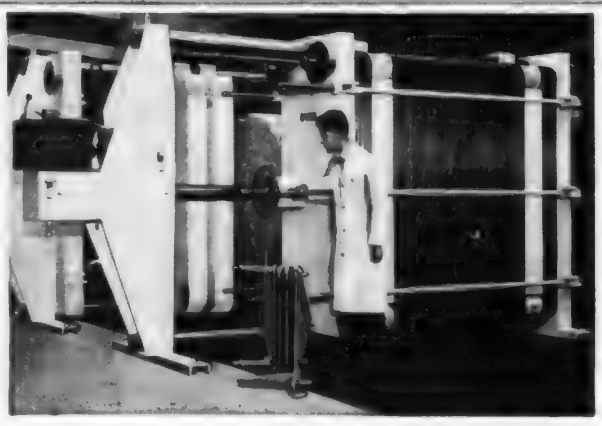

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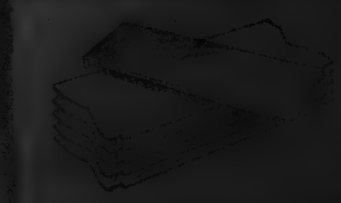

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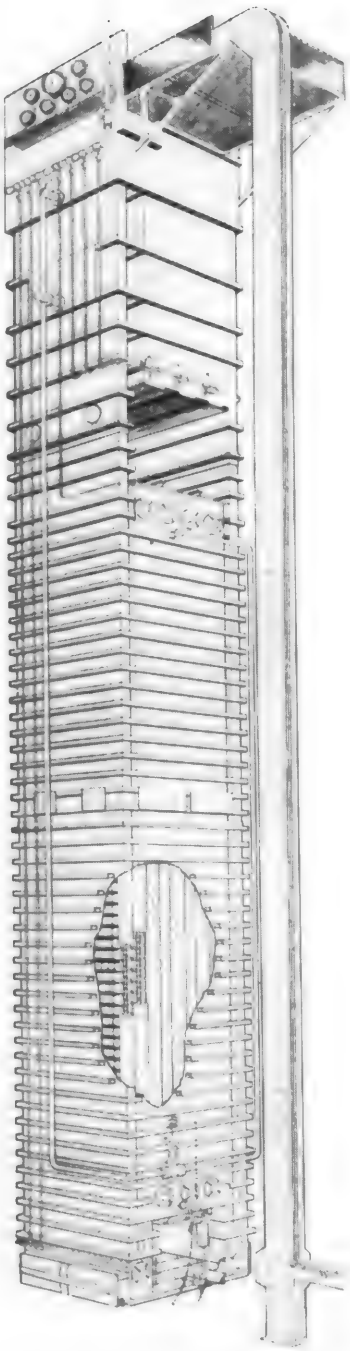

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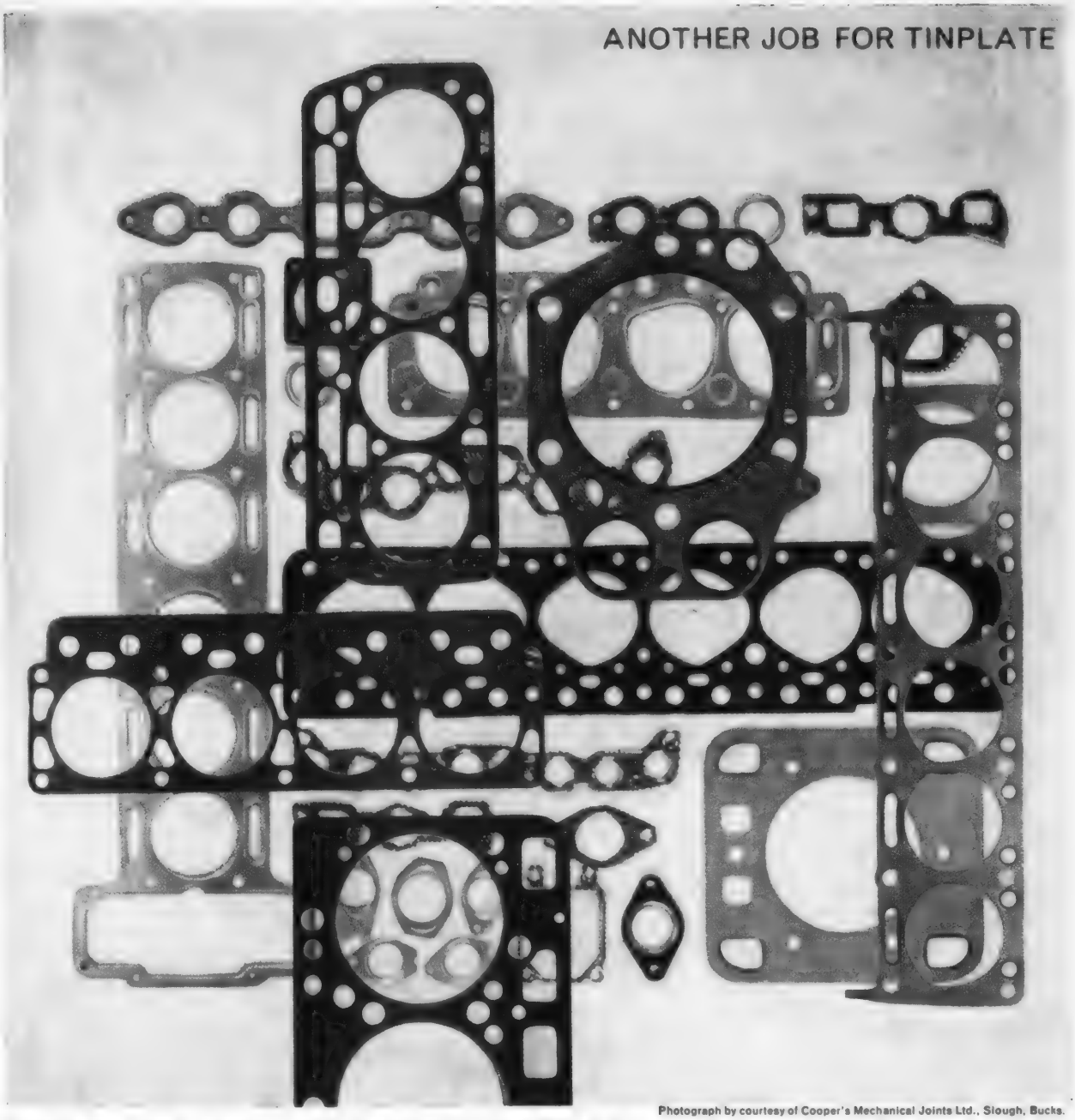

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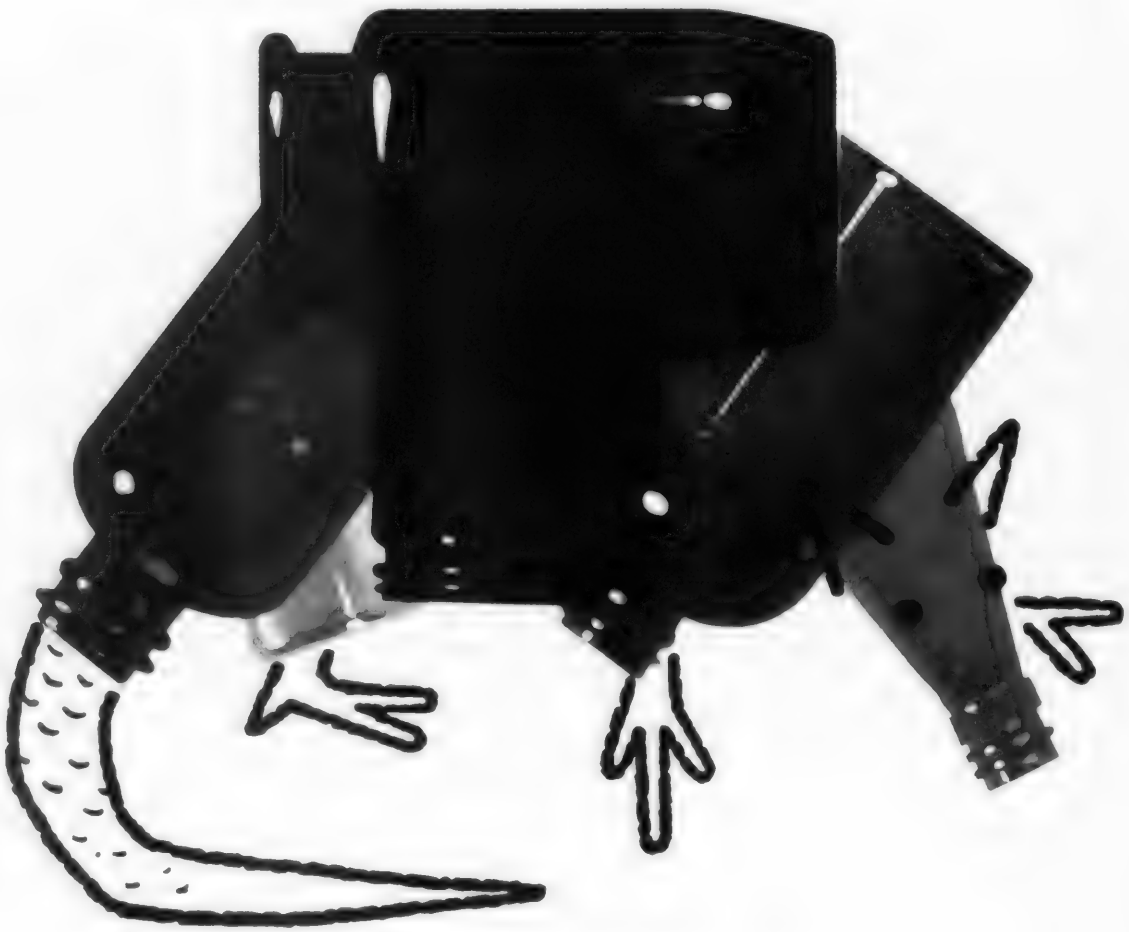

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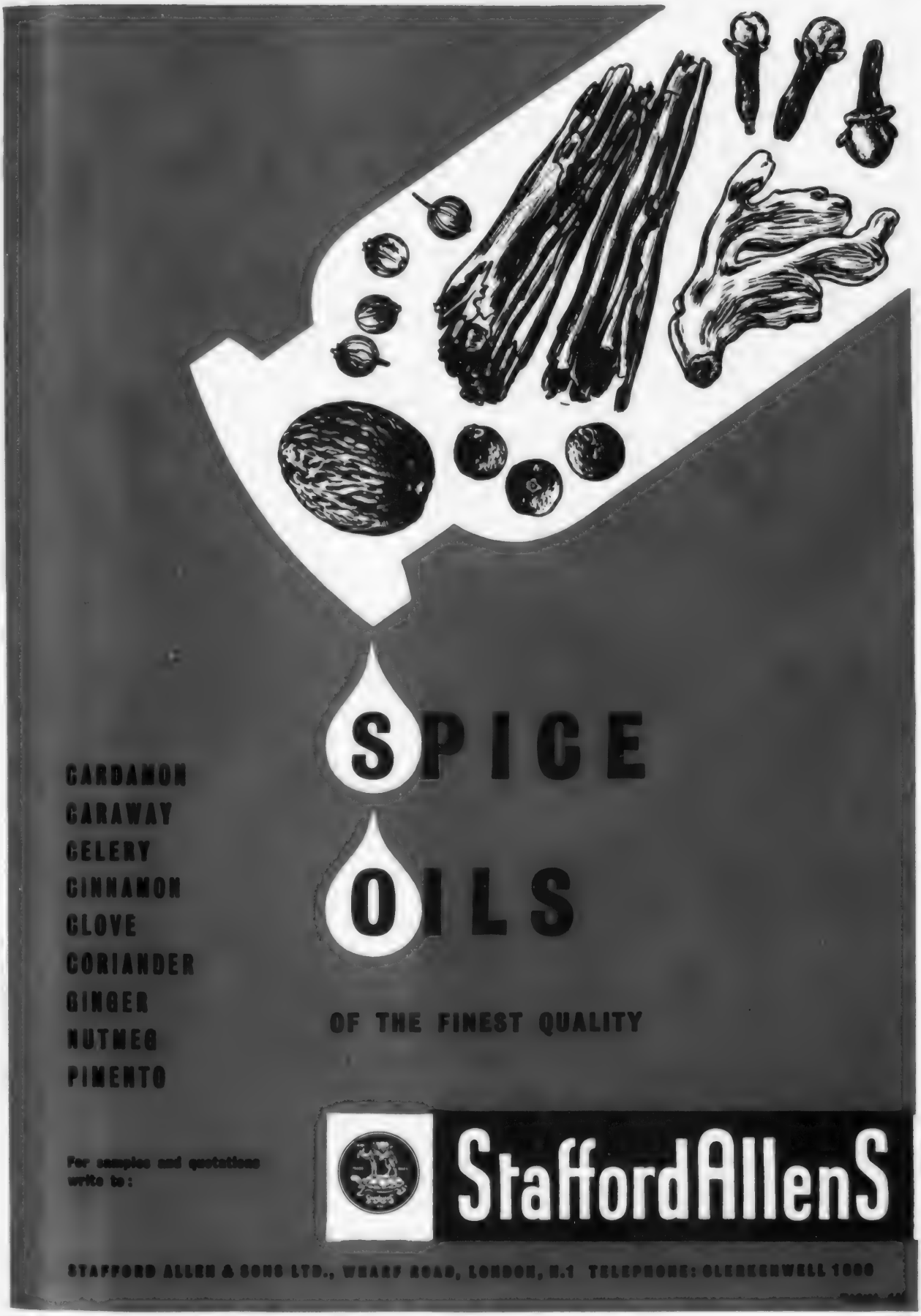
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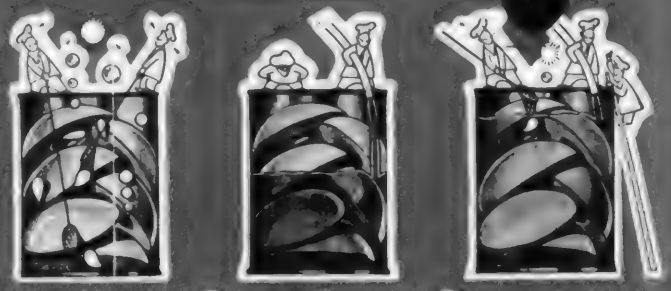

1 Pre-Vacuumizing : Immediately after indexing, a vacuum is pulled on the container liberating free air and also entrapped air that might exist in product cavities or pockets.

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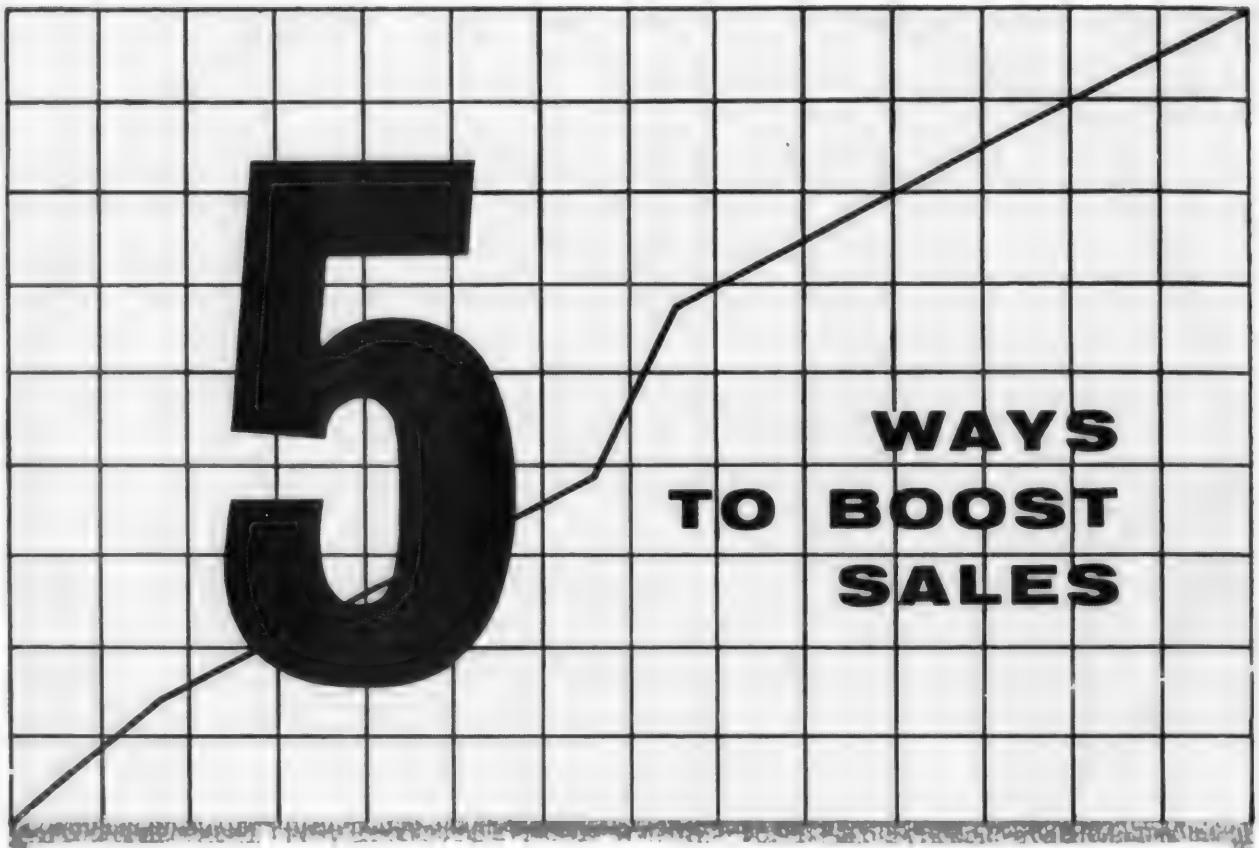

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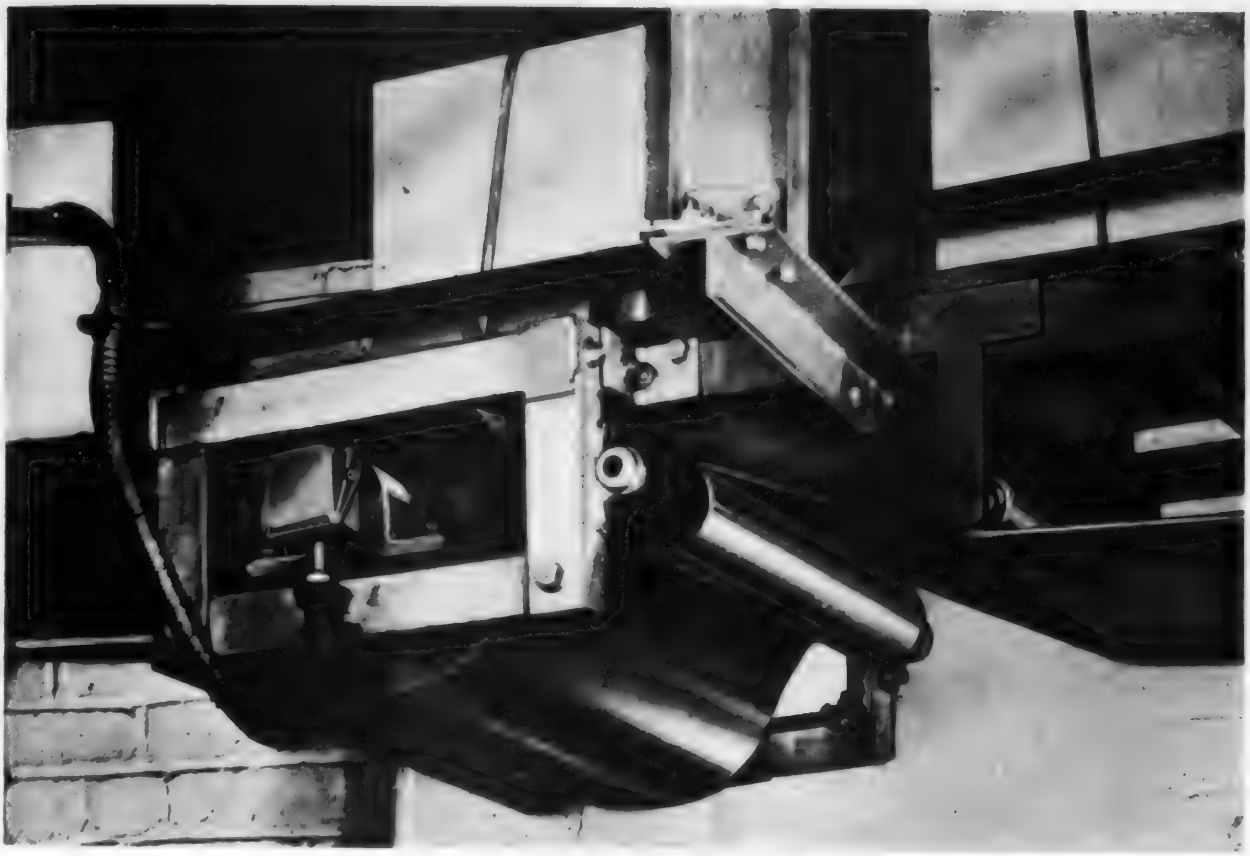

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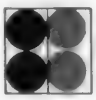
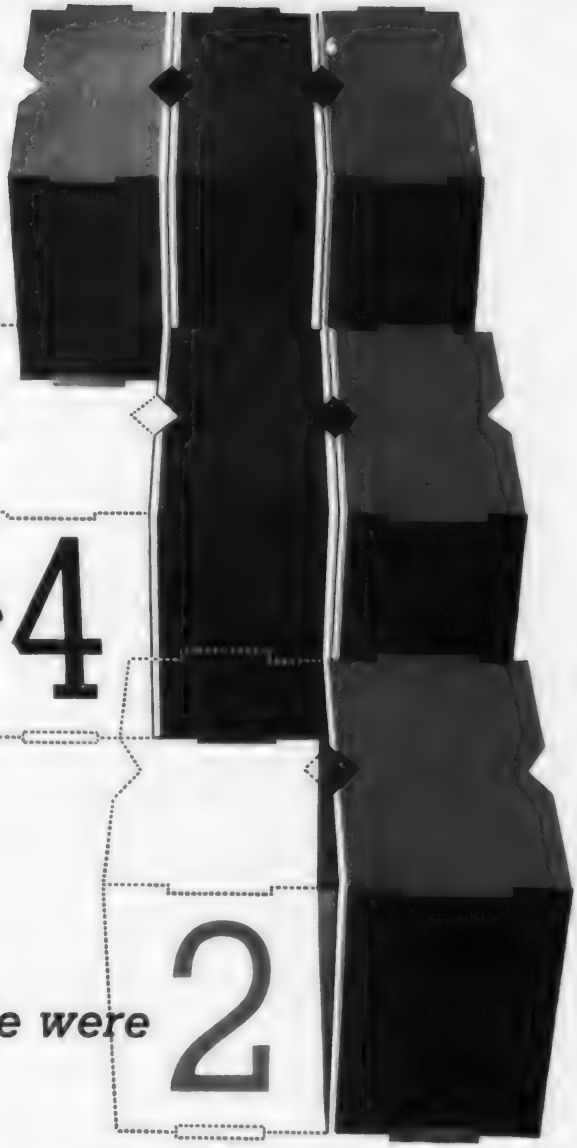
first there were 6



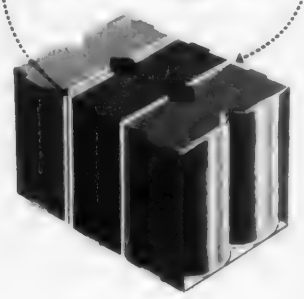
...then there were 4

...then there were 2



...then those were sold!

splitpak



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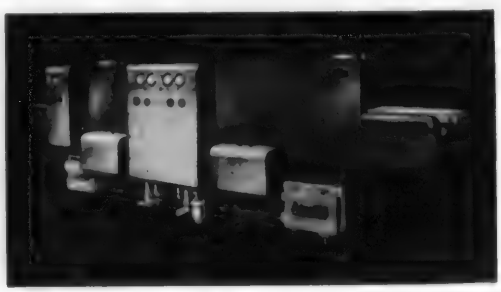

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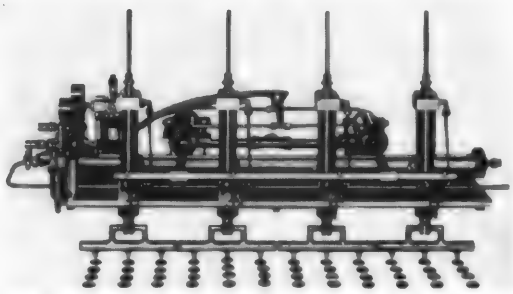

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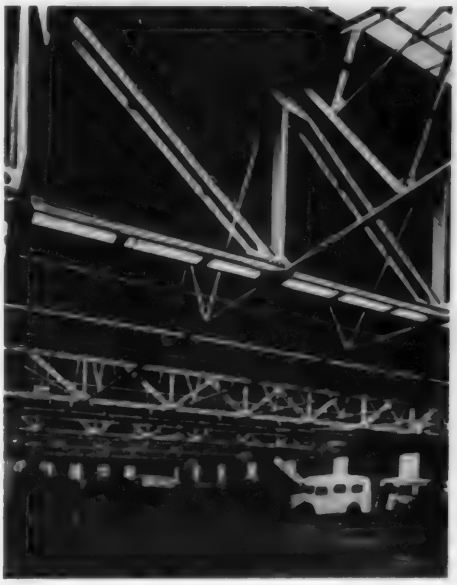

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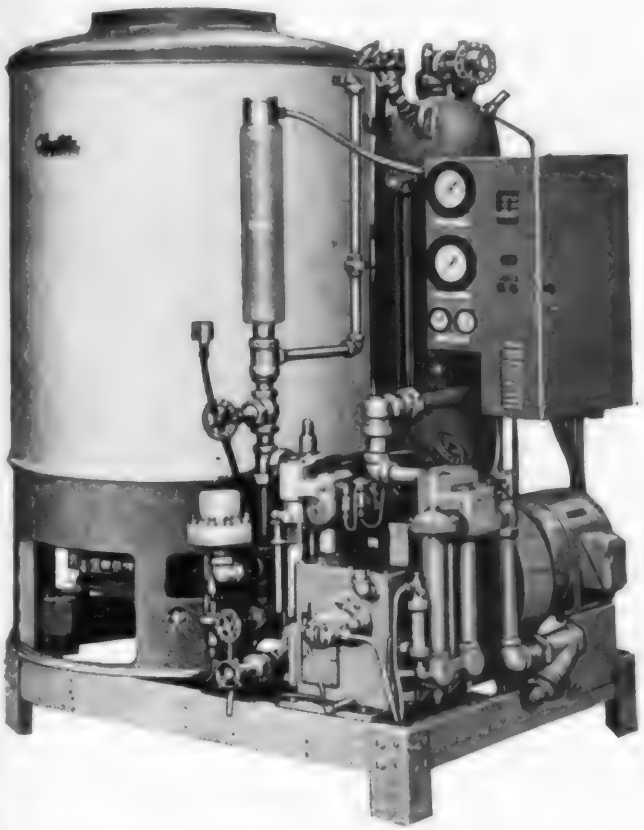

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FOOD
Manufacture

Volume 36. Number 5 Editor: Anthony Woollen, B.Sc., A.R.C.S., A.R.I.C. May 1, 1961

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Your ADVITA guide to

Top Quality EMULSIFIERS

MAKE A GOOD PRODUCT BETTER BY USING THE BEST EMULSIFIERS

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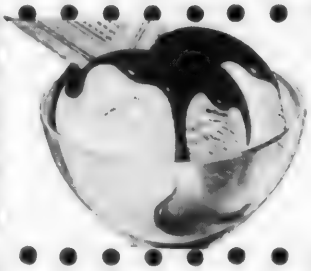
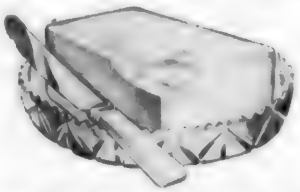
Advita Limited are recognised as the leading experts on emulsifiers for all branches of the food industry and each of their products has been proved to be the finest of its kind available.

All the Advita emulsifiers recommended here are ideal for the purposes specified and the final choice must be governed by your manufacturing conditions and circumstances. Your local Advita Man will gladly give you advice on your individual requirement.



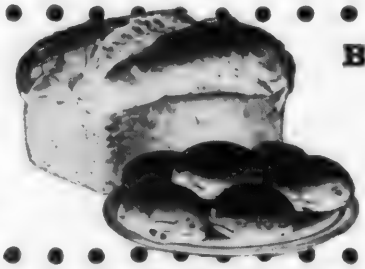
ICE CREAM

Admul G.M.S.
Admul M.G.A.
Hymono
Admul 150
Admul Kosher



MARGARINES

Admul M.G.A.
Admul M.G.J.
Hymono
Admul G.M.S.



BREAD & BUNS

Admul G.M.S.
Rival (Plastic G.M.S.)
Rivallo

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FOOD
Manufacture

Vol. 36, No. 5 May 1, 1961

Delicate eating

UNTIL we had a look round the Delicatessen Exhibition we thought we knew what delicatessen foods were; now we are not so sure. The term comes of course from the German "Delikat Essen," but *delikat* does not mean delicate, it means delicious, so strictly "delicatessen" is delicious eating, not delicate eating as is commonly supposed.

All this is a quibble about the meaning of words; if we say that delicatessen foods are fine foods for the discriminating consumer as opposed to the mass-produced foods for the mass market we are getting nearer the mark, but even this definition must be qualified, for what is delicatessen in one country may be common food in another; cornflakes for example, we learned to our surprise, are considered delicatessen in Italy. So, too, we were even more surprised to find a stand at the exhibition devoted to the products of a very large and well-known producer of potato crisps.

Etymological discussion apart, sales of delicatessen foods have been leaping in recent years and the reasons are not far to seek. The booming popularity of foreign travel has made ordinary people familiar with foreign dishes, and no sales resistance is to be expected from them when the same foods are offered them at home. Then, too, the large influx of immigrants and tourists coupled with the general political stir-up in the world today has created a demand for foreign foods. Large colonies of foreign nationals in our big cities have established their own provision shops selling their own foods, and Britons have acquired the habit of patronising these shops when they feel the need for food which is rather different.

Then there is a natural reaction which breaks out in each of us from time to time against the unvarying monotony of packet foods to be seen in their millions from one end of the country to another. This tendency to rebel is artfully fostered by those whose business it is to separate us from our money and who create the gourmet cult, persuading us to believe that to eat certain foods is high class. Thus slight snobbery is attached to delicatessen, borne out by the fact that sales of these foods are heaviest among the better-off. Whether this is a good thing for the trade or not is open to question; we are inclined to think it is not a good thing, but there is no doubt that a ready market will always exist for foods out of the common run, a fact being taken advantage of by a few enterprising British manufacturers who are doing very well in this rather specialised field.

How processing damages milk protein

THE RATHER colourless title "Control of the Nutritional Qualities of Milk Protein" concealed the theme of a recent lecture of more than passing interest. The lecturer was Dr. J. Mauron of the Swiss Nestlé Company and the occasion a meeting of the Food Group.

Nutritionists are concerned about the damage to protein quality caused by processing, and Dr. Mauron gave an insight into the thorough investigation which his company are making in the case of processed milk. How far does the processing of milk to give pasteurised, sterilised, evaporated, sweetened and condensed, and dried milk produced both by spray and roller techniques, cause deterioration in protein quality, and why?

The answers to these questions are of course not yet fully known, but the speaker gave a succinct account of the state of present knowledge and described some recent investigations which have yielded interesting information.

The nutritive value of milk protein is high, not quite as high as egg protein (85 compared with 96) but much higher than vegetable proteins such as wheat (61) and peanut (50). During proper processing, very little alteration of the nutritive value, biological value and digestibility of milk takes place; H.T.S.T. pasteurisation alters them not at all, sterilisation, condensation, evaporation and drying alter them only to the extent of a few percent.

The picture, however, is slightly different when milk proteins are combined with other proteins, and in the presence of wheat protein, for example, the protein efficiency of sweetened condensed milk is

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significantly higher than that of evaporated milk. There is also a significant difference between spray dried and roller dried milk.

In amino acid composition, as determined by classical methods, there is no difference between the various processed milks with the exception of lysine, which is highest for raw milk. Yet in one series of experiments overheated roller dried milk had only 20% of the nutritive value of raw milk when fed to rats, although the lysine content of the former fell only to 6·3% compared with the 8·1% lysine content of raw milk. Clearly, classical methods of determining amino acids do not reveal why overheated roller dried milk should be so markedly inferior.

Comparison with amino-acid determination methods using enzymes gave a clue. It was found that although about one-third of the lysine had been destroyed during the roller drying, the remaining two-thirds had been inactivated, and the theory is that the inactivated lysine is not available for digestion.

Extension of this work to other processed milks disclosed that the proportion between the amount of lysine destroyed and that inactivated is always constant. It is believed that during heating the lysine groups react with lactose and are thereby inactivated, a fact concealed by classical methods of acid hydrolysis, which would still give rise to free lysine; enzymic digestion, however, would not liberate lysine from those groups which had reacted.

It is important to know also what deterioration occurs in milk protein not only during processing but during storage, and Dr. Bender made a thought-provoking observation that samples of the same batch of skimmed milk powder stored in deep freeze and in a cupboard in the open laboratory deteriorated in nutritive value precisely the same amount. As was pointed out by Professor Kay, the question of the retention of the nutritive value of preserved stored milk is more important in underdeveloped countries than in countries which consume their preserved milk fairly quickly.

No rotation of stock in this cinema!

EXTRACT from the City of Birmingham public analyst's report: "A complaint that chocolate sweets bought in a cinema were stale was fully confirmed by both their taste and appearance. Further enquiries elicited the astonishing facts that no sort of routine turnover of stock existed and that sweets three years old were sold next to fresh stock of the same pack. These facts were firmly pointed out to the manager concerned."

Whisky or whiskey?

THE AUTHOR of the famous Anatolian proverb "*in vino veritas*" would doubtless be reluctant to alter it to accommodate the drinking habits of the average Briton. "*In whisky veritas*" or again "*in whiskey veritas*" might, we feel, be more apt. Such sensible transliteration would instantly be obstructed by the sceptic who would challenge us to prove the difference between whisky and whiskey. "What's in an *e*?" he would jibe, misquoting the bard.

Yet the *e* makes a world of difference. We do not subscribe to the school of thought which ascribes to different distillation techniques the intrinsic difference between Scotch whisky and Irish whiskey. No, the essential difference between these two heavenly brews lies in the manner in which they are consumed. If you endeavour, as a colleague recently did, to obtain whiskey after 11 p.m. in Dublin, you will find it impossible unless you request a policeman to direct you to the nearest establishment which assuages nocturnal thirsts. To reproduce similar experimental conditions, try to find a whisky establishment in Edinburgh open after 11 p.m. Not a hope that your search will end in success, because the location of such oases is revealed only to the kilted natives of Caledonia.

Therein lies the difference. Surely it is only by a perfect understanding of such subtle nuances that life becomes worth living!

More fuss about milk regulations

There are certain grounds for the strong objections put forward by the County Councils Association to the proposal that regulations should be made permitting the use of the description "milk" in relation to bread made with skimmed milk. The Association's memorandum to the Ministry argues that although the present position is unsatisfactory, the public are now better protected than would be the case if regulations were made on the lines now proposed.

The Association says that it has consistently objected to the use of this description and has expressed support for the minority view of the Food Standards Committee that only whole milk solids in adequate amount should entitle a loaf to be called milk bread, and states: "Even the majority of the committee were only prepared to allow the use of the description for skimmed milk bread if coupled with a declaration of content which would enable the purchaser to know whether he was, in fact, receiving whole or skimmed milk solids. It appears, however, that even this proposed safeguard has not been accepted by the Minister."

The Association adheres to the view that quite apart from the consideration of what is or is not milk bread, the debasement of the term "milk" which is now contained in the present proposals is bound to increase the difficulties of food and drugs authorities in enforcing legislation relating to other products such as milk toffee, milk chocolate, milk jelly, milk pudding, etc.

Further objections to the proposals lie in the confusion of descriptive terms which it is proposed that the trade should be allowed to use in the description of bread; bread may be described as "bread," "butter bread," "milk bread," depending on different constituents which are likely to be a complete mystery to the average purchaser.

The Association adds: "In conjunction with the alternative declarations of content these will provide advertisers with a considerable field of opportunity to confuse and mislead the public."

False teeth for cows

WE ARE told that a cow's front teeth wear down in five years, the animal becoming unable to eat enough to keep up the required butterfat average. An American firm has now produced a set of stainless steel crowns which can be fitted to the cow's natural teeth.

Whether or not the deterioration in milk yield is due entirely to the wearing of the teeth we are not in a position to say. If the productive life of a dairy cow, which in this country is four to five years, depends on other biological factors besides teeth, fitting false teeth will do no more than slightly prolong its useful life. We would like further information on this interesting point.

Hopped-up locusts are non-meat

ROMAN Catholics of course do not eat meat on Fridays. But what is meat? That this question may not be as simple to answer as it sounds is shown by the following moral problem culled from the "enquiries answered" column of an American ecclesiastical journal. *Question:* "We just received a can of Reese-brand fried grasshoppers from Japan. Are these 'meat' or 'non-meat'?" *Answer:* "The custom of a country or region determines whether a certain food is 'meat' or 'non-meat,' and I don't believe we Americans have any uniform established customs regarding the eating of grasshoppers. However, we do consider rattlesnakes, turtles, frogs and snails to be 'non-meat,' so I think we can put your hopped up locusts in the same class. The problem does not threaten to become widely critical."

The brotherhood of turning-spit roasters

WE WERE speaking recently to Mr. Charles Liebman, burly bearded chancellor of the British Chapter of the Confrérie de la Chaine des Rotisseurs, or Brotherhood of the Guild of Turning-Spit Roasters, to give it its English title, whose members bind themselves to roasting by turning spit. One of the aims of the brotherhood is to raise the standard of catering generally, and according to Mr. Liebman they are doing this by "fighting poisonous crop sprays, adulteration of wheat flour by the addition of agene, and in general those who undercut standard market prices by lowering the quality of the food offered to the trade and public, fresh, frozen or canned."

La Confrérie de la Chaine des Rotisseurs is the title of the world's oldest order of gastronomy. It was founded in 1248 by Louis IX, crusader king of France, later canonised. The guild is the nearest thing France has to compare with our City liveried companies and has had a chequered history. Given a coat of arms and a royal warrant in 1610, it was suppressed in 1789 by the French revolutionaries in the same batch as Jesuits, freemasons and "all guilds and secret societies," as Robespierre put it.

In 1950 five French gastronomes under the leadership of Jean Valby, the writer and publisher, revived the Chaine des Rotisseurs, which has as its principal aim the restoration of the turning spit to its place of honour in kitchen and grillroom. To-day there are over 7,000 members in 37 countries.

The British Chapter was formed in 1959 under the honorary presidency of the Duke of Richmond and Gordon. We are told that the British Chapter already numbers 200 members from practically every walk of life, including such well-known personalities as the Duke of Bedford, the Marquess of Milford Haven, the Marquess of Queensberry, Baron Hastings Ismay, the Rt. Hon. Ernest Marples, Mr. Henry Sherek the impresario, and Air Chief Marshal Sir Francis Fogarty. It does occur to us to wonder irreverently how many of these people have ever roasted with a turning spit, but perhaps that is a question that should not be asked, especially as there are indeed in the guild's ranks many prominent members of the catering trade.

The guild recently held a world gastronomic congress in Paris to celebrate the tenth anniversary of its revival, and we understand that the British buffet was well stocked with examples of high grade British food provided by members of the Food Manufacturers' Federation, the Cake and Biscuit Alliance and the Cocoa, Chocolate and Confectionery Alliance. Diplomas in the form of illuminated scrolls were awarded to these three bodies by the council of the order in Paris.

Motorisation boosts fish catch 580%

FOR A thousand years the fishermen of Ceylon have put to sea in primitive sailing rafts—teppans—built of logs lashed together. These simple craft have the great advantage of being able to slide over the coral and sand reefs encircling much of the island and can be pushed ashore anywhere, but as fishing craft they are not very efficient and are limited in range. Average catch of these rafts was of the order of 3 cwt. a month, a very low figure.

A Finnish fishing expert had the bright idea of fitting these teppans with outboard motors. The result was astonishing; the teppans were able to reach distant and profitable fishing grounds and the average monthly catch jumped to over a ton, an increase of 580%. The fishermen's income trebled.

But there is a difference between fitting an outboard motor to a primitive craft and designing a special fishing vessel with engine and net handling gear. If the Ceylonese had proper vessels the catch could be multiplied many times. This is the view of F.A.O., who in 1951 were called in by the Ceylon government to advise on building up a mechanised fish industry. Fitting outboard motors to the teppans was only a stop-gap until more elaborate mechanisation plans could be put into effect.

Between 1951 and 1958 many hundreds of existing boats were mechanised as a result of experience gained by F.A.O. experts in India. In 1958, an ambitious plan called for 8,000 mechanised boats to be built within the next ten years. So far 600 boats of a special improved design have been built.

Although Ceylon has 90,000 fishermen it still needs to import fish. The marketing and distribution system there needs to be streamlined, for old-fashioned systems of marketing keeps up the price.

Bridging the gap

"THE SUCCESS of the Leonard Hill Technical Group is based upon pioneering and innovation. In this tradition, the Group has introduced over the past eleven years five new journals which bridge the gap between invention and practical exploitation; they are: *World Crops* (1949), *Corrosion Technology* (1954), *Automation Progress* (1956), *Conferences and Exhibitions* (1956) *and Building Materials Export* (1958). The first journal ever to be published for the food manufacturing industries was FOOD MANUFACTURE, which was published by this house in 1927."

The above quotation, taken from a recent issue of *World's Press News and Advertisers' Review*, neatly summarises the purpose of these journals and the reason for their existence.

Telling the world

JUST as the editorial matter in FOOD MANUFACTURE provides an essential link between the technologists and men of science and the production men in the factories, so also does this journal play a vital rôle in bridging the gap between the manufacturers of machinery and food adjuncts and the users, consumers and potential buyers of these products in all parts of the world.

To-day this journal is playing an essential part in the development of overseas trade. Companies who are really determined to maintain productivity and employment and are really interested in selling abroad are using FOOD MANUFACTURE for their advertising in their current campaigns.

Whey is an excellent pig food

DISPOSAL of surplus whey is a problem facing cheese manufacturers in many countries. An article in the Irish journal *Farm Research News* states that pigs can make satisfactory liveweight gains provided they are given a meal supplement. The article states that a gallon of whey is equivalent in feeding value to ¾ lb. of barley.

It is of course uneconomic to transport whey very far as its bulk is large compared with its nutrient content, so it must be used near the cheese factory. Building a piggery near a cheese factory might therefore be a commercial proposition, with a pipeline to transport the whey from the plant.

Pigs should not be allowed to drink unlimited quantities of fresh whey because if they do they can develop a condition similar to bloat in cattle, which is usually fatal. The article therefore recommends that the whey be kept a day or two to become sour before being fed to the pigs. Also, as the dry matter in whey is not a balanced pig food, when fatteners are being fed the meal must be of a higher standard than usual. When 3 lb. of meal per pig per day is allowed, the protein content of the meal must be at least 20%.

The amount of whey consumed can be controlled by varying the amount of meal allowed (pigs at 100 lb. will consume up to 1½ gallons of whey per day). Small quantities (less than ¾ gal. per day) can be mixed with the meal in the same way as skim milk; larger quantities are best given in a separate container, in conjunction with a meal of 20% protein content.

In experiments in which three lots of pigs were fed different proportions of meal and whey, it is stated that those on a lower meal ration took about 20% longer to reach bacon weight but graded better than those on a higher.

Putting the Brown into Food

Manufacture of 18 tons/day of Clark's Caramel

The only universally permitted single brown colour, caramel is widely used in food for its colouring and, to a less extent, for its flavouring properties. Originally made by burning sugar for colouring rum, it is now made by reacting sugar with alkali under controlled conditions, and in this exclusive article we describe how Clark's Caramel is made at the Millwall factory of Brown and Polson, Ltd., which we recently visited.

CARAMEL is first and foremost a colouring matter and it is used much more widely than is generally realised. The colour naturally associated with most cooked food is brown in its various shades, and most processed foods and beverages which are brown in colour have a judicious amount of caramel added to enhance their appearance.

Although caramel has a flavour of its own its contribution to food flavour is small; in most cases it is present in too small a quantity for its effect on flavour to be appreciable. Its psychological stimulus is marked, however; many people still cherish the illusion that a rich colour, particularly in beverages, indicates a full flavour and nourishing qualities, a desirable state of mind which caramel helps to foster!

Brown is one of nature's commonest colours, yet paradoxically there are no universally permitted brown colours which are entirely satisfactory for all purposes. There is not, in this country, a permitted artificial brown colour consisting of a single dyestuff and thus not liable to change in hue through fading. Hence caramel is the principal brown colour used by the food industry, and one of the very few which is universally permitted. For full use to be made of its desirable qualities its limitations must be recognised; there are grades of caramel for many different purposes, and use of an incorrect grade is likely to lead to trouble. (It is perhaps worth mentioning at this stage that there is no permitted oil-soluble brown colour, which makes life difficult for the makers of artificial chocolate. A grade of spray-dried caramel has, however, been developed which can be dispersed in chocolate in the conch.)

Newly-made liquid caramel is sieved through a stainless-steel high-speed vibratory sieve before pumping to storage tanks. This removes occasional particles of charred caramel from the finished product.

What is caramel?

Put in its most basic terms caramel results when sugar is burnt, and at one time it was made this way in the sugar plantations for colouring rum. The reaction, however, is uncontrollable and can only be done on a small scale, and the foundations of the modern method of heating reducing sugars under controlled conditions with ammonia or sodium hydroxide were laid in Germany in the late nineteenth century in conditions of great secrecy. About the same time Salamon and Goldie, working on behalf of George Clark and Son, Ltd., developed a very similar process.

It is a surprising fact that even to this day very little is known of the chemistry of caramel or of the reactions leading to its formation. Little advance has been made since the publication of Salamon and Goldie's paper in 1900 (*J.S.C.I.*, 1900, 19, 301) and the reasons why a strongly exothermic reaction occurs when reducing sugars are heated with alkalis,

The bung hole of a stainless-steel drum is sealed with a special tool after being filled.

during which the alkali ceases to exist as such and the alkalinity of the mixture drops, remain obscure. Neither is very much known of the chemical constitution of caramels. During the last war a study of the loss of colour of dehydrated foods focused attention on the work of Maillard, whose discovery of the reaction between reducing sugars and amino acids had hitherto remained obscure. This work was followed up in the U.S.A. and at the Low Temperature Research Station here, without any great advance being made on the original empirical findings, one of which was the fact that the only thing which would stop the reaction was SO_2.

Brown and Polson enter the field

Brown and Polson, Ltd. (see FOOD MANUFACTURE for April, 1960, p. 137 for a description of their Manchester glucose refinery) came into the caramel business in 1955 when they acquired Geo. Clark and Son, Ltd. This business was founded in 1836 and within 20 years had established important connections as suppliers of sugar to several prominent London brewers. Caramel manufacture was begun at Millwall in 1898.

Basic requirements

Caramels are colloidal substances and show amphoteric properties. For food use they must obviously be stable in the food, and in view of the wide variety of foods and of the conditions under which they are used, certain problems are raised.

Colloidal particles can be either positively or negatively charged, and this applies equally to caramel particles. Caramel particles must carry the same charge as the material of the suspending medium, otherwise the caramel will be precipitated. Other requirements are stability to acid, alcohol and salt, and as many of these requirements as possible must be combined in the one product. The ideal caramel would have a high tinctorial value, complete solubility without deposition on standing (in the case of beverages), and an unobjectionable flavour.

For soft drinks, many of which contain negatively-charged substances, negatively-charged caramels are required, otherwise precipitation will occur. Unfortunately, ammonia, for reasons which are not clear, adversely affects the alcohol stability of caramel, and caramels for use in spirits such as whisky and brandy are not made with ammonia but with sodium hydroxide. These caramels are unsuitable for use in, for example, soft drinks. No caramel has yet been made which is stable in really high concentrations of both acid and alcohol.

Careful control of manufacturing conditions and the use of pure raw materials are important, especially for the avoidance of objectionable flavours. Over-caramelisation causes the development of a harsh flavour which is accentuated if impurities are present.

MANUFACTURE

As already explained, caramel is made from reducing sugars. There are only two commercial sources of these for caramel manufacture: (1) invert sugar, and (2) solid glucose in various forms. Caramels for use in high proof spirits are made from invert sugar produced from high purity sucrose; caramel for soft drink use is made from glucose. For other purposes, the two kinds of raw material are often interchangeable.

No caramel can be more stable or purer than the starting material, and it is therefore important that the sugars used should be of high purity. Raw cane sugar for the manufacture of invert is subjected to an elaborate refining process at Millwall which is beyond the scope of this article, but which consists essentially of washing, centrifuging and treatment with activated carbon. Solid glucose is refined at the Manchester factory.

Caramelisation with ammonia

The caramelisation process consists essentially of mixing the reducing sugar solution with ammonia, allowing the reaction to proceed (with careful temperature control), followed by rapid heating and quick cooling. The heating process produces the colour constituents.

For any given conditions of type and of raw material and concentration, the two variables which affect the degree of caramelisation, and which must therefore be rigidly controlled, are time and temperature of reaction.

Precise records of every batch made are kept, and here the caramel maker is chalking up particulars of the batch in process.

Fundamental relationships in the process are: (1) the relation between the degree of colour (*i.e.* tinctorial power) obtained and the time of reaction is a straight line; and (2) the higher the tinctorial value the less stable is the final product.

At the end of the reaction, water is added so that the finished caramel must have a higher colour value at this stage than in its final saleable form.

Caramels are very corrosive and must therefore be handled in stainless steel plant or in equipment which is lined with glass or suitable synthetic materials.

Preparation of "catalyst"

In caramel manufacture the ammonia (or alkali) is referred to as the "catalyst," although strictly speaking it is not a catalyst because it combines with the reducing sugar in some way which is not fully understood, causing the caramel to have a nitrogen content of anything up to 6%. This nitrogen cannot be removed by heating with caustic soda and must therefore be bound in a complex manner.

Ammonia liquor is stored underground in two large tanks. It is elevated by air pressure and metered into the reducing sugar in the caramel pan by a pre-set meter.

Reaction vessels

Caramel is made in the reaction vessels in batches of up to 9 tons each. Three of the vessels, two of stainless steel and one of copper, are unpressurised; the fourth is a glass-lined mild steel pressure vessel. Each vessel is fitted with coils through which either steam for heating or cooling water can be passed.

Invert sugar solution is piped from the refinery and measured into the reaction vessel by means of a calibrated header pan. The ammonia "catalyst" is metered by an automatic flowmeter pre-set to deliver the correct quantity, and mixed with the sugar solution by a mechanical agitator. Tem-

A workman tending the hopper which feeds rough dried caramel to a powdering mill. The powdered caramel is afterwards finely sieved and packed ready for despatch. The entire operation takes place in one room fitted with a dust collecting system.

A caramel maker studies the cam which automatically controls the time/temperature cooking programme.

perature of the mixture before addition of the ammonia is below 60°C., and the reaction being exothermic, the temperature is allowed to rise to 95°C. (the "ammoniating temperature") at which point it is held by circulating cooling water through the coils until the *p*H of the mixture is about 7·5. This takes from 30-90 minutes, depending on the grade of caramel.

Steam is then put through the coils to raise the temperature to the boiling point, and from this stage until the end of heating, the temperature and time of reaction are controlled automatically by a time-temperature programme controller. During the heating processes the mixture boils, its volume decreases and its colour darkens. During the boiling process intermediate colour samples are taken as a check of the caramelisation.

At the end of the reaction, when the desired colour has been achieved, the steam is turned off and water added to the mass, which is cooled to 50-55°C. It is sampled for colour, *p*H, solids content and stability tests, and pumped to one of 10 glass-lined storage tanks through a vibrating stainless-steel sieve.

No batch of caramel is dispatched until it has passed an extensive laboratory testing régime.

Pipelines throughout the production section are of stainless steel, sectionalised for easy cleaning.

Filling

The finished caramel is filled by weight into drums and casks of various sizes which include 1 and 5 cwt. drums, 5 and 6 cwt. wooden casks, etc. All drums are internally lined with a suitable lacquer and very thorough investigations have been carried out to arrive at a conveniently-acceptable solution to a difficult packaging problem. The firm says that 20% of its production is exported.

Some Suppliers of Equipment

Elliott Bros. (London), Ltd.: instruments.
A. E. Johnson: caramel pans.
Mono Pumps, Ltd.: pumps.

Why Single Out Milk?

asks Mr. Wynne-Owen in the May issue of **Dairy Engineering,** which also includes an article on the Production of Jumbo Cheese and a report of Northern Dairies' New Dairy at York.

Automatic Biscuit Production is reported in **Automation Progress,** which also studies Pneumatic Control Circuits and gives information on Heat Operations to be Centrally Monitored.

Three articles forming a special feature on Pipes and Pipelines appears in **Chemical and Process Engineering.** Cast Iron as a Material of Construction is also surveyed.

Conferences and Exhibitions gives information on Conference Planning and considers Outlets for Condensed Display Units. Girls and Gimmicks in Sales Conference Spectacular is a description of a theatrical-type conference.

The Chemistry and Uses of Polyurethane Foams are dealt with in this month's **Fibres and Plastics,** which also presents an account of Low Temperature Radiant Heat Drying.

Manufacturing Chemist comments on Temperature Measurement and Control, considers Small Scale Manufacturing Equipment and reviews the New Factory for Bristol-Myers Products. Part five of the series on the Scent of Flowers and Leaves reviews the Snapdragon family.

Equipment for Paint Spraying is described in **Paint Manufacture,** which discusses the Manufacture and Application of Fatty Acids, includes the sixteenth part of Advanced Paint Chemistry and abstracts papers presented at the First International Congress on Metallic Corrosion.

An Economic Review of the Tanker Industry is given and Trends in Oil Tanker Design are noted in **Petroleum.** An article on the Status of Geochemical Prospecting is also included.

Specimen copies of these journals can be obtained by writing to the Circulation Manager, 9, Eden Street, London, N.W.1.

SALMON CANNING — A Thriving Industry of the Canadian North West

By Elliot B. Dewberry, M.B.E., F.R.S.H., F.R.I.P.H. & H.

The salmon canning industry of British Columbia has grown enormously since it began in 1860 and is now among the world's largest fish industries. This article describes the main characteristics of the five species of fish and how the fish are processed.

FROM time immemorial the waters of the North Pacific have been abundantly stocked with salmon. The first commercial salmon fishing operations in British Columbia were commenced by the Hudson Bay Company as early as 1829. They purchased salmon from the Indians on the Fraser River and pickled them in barrels. In 1835, it is recorded that 3,000 to 4,000 barrels of salted salmon were exported mainly to the Hawaiian Islands and to Asia.

An aerial photo of the Imperial Cannery of British Columbia Packers.

The five species

There are five species of the Pacific salmon used in the commercial canning industry and all are included in the genus Oncorhynchus (hooked snout):

(1) *Oncorhynchus tschawytscha*, the largest, known as spring, quinnat, chinook and tyee (in British Columbia); quinnat and sacramenta (in California); quinnat and king (in Alaska). It is found throughout the region from the Ventura River, California, to Norton Sound, Alaska; and on the Asiatic Coast as far as Northern China. Average weight and length 20-25 lb. and 38½ inches respectively. It is the only salmon caught in coastal waters practically throughout the year. Matures in 3 to 7 years.

(2) *Oncorhynchus nerka*, known as sockeye (Fraser and Adams Rivers); blue-black (Columbia Rivers); red salmon (Alaska). Average life span 4 to 5 years, but may live 6 years. Average weight and length 5-7 lb. and 24-28 inches respectively. Maturity is normally reached in the 4th to 5th year. Sockeye is the most highly prized of the five species of salmon found in British Columbia waters because of its rich deep red flesh, firmness of its tissues and the vertebrae small which makes it most suitable for canning purposes.

(3) *Oncorhynchus kisutch*, known as cohoe, silver or medium red salmon, and in some areas of British Columbia, blueback. This fish is caught from Northern California to North-western Alaska. It matures normally in the 3rd year and has an average weight and length of 9 lb. and 28 inches respectively. Life span 3 to 4 years.

(4) *Oncorhynchus gorbuscha*, known as pink or humpback salmon. This is the smallest and most numerous of the five species and is common along the coast of British Columbia, being found from Northern California to North-Western Alaska. Its colour is bluish above and silvery below, the posterior and upper parts having a few oblong black spots. The flesh is pink but paler in colour in the males—hence its canned name "pink salmon." The vertebrae are small. Average weight and length 4-5 lb. and 24 inches respectively. It matures at the end of the 2nd year. Life span about 2-3 years.

(5) *Oncorhynchus keta*, which is known as chum, keta, qualla or dog salmon, is caught all along the coast of British Columbia and ascends practically all the streams. The fish has a wide distribution from Puget Sound northwards to south-east Alaska. Its average weight and length is 8-10 lb. and

32½ inches respectively. Life span 3 to 5 years. Chum matures in its 3rd, 4th or 5th year. It is especially suitable for canning, salting, smoking or freezing.

Return to fresh water

The salmon after remaining in the sea for a period ranging from 2 to 6 years, reach maturity and are compelled by sexual impulse to return to the fresh water to spawn. Salmon usually return to the stream from which they migrated to the sea and frequently to the same tributaries where they were hatched. They cease feeding in the sea at the beginning of the spawning migration and none of them feed on return to the fresh water. The fish draw upon their store of fats for power and maintenance when making the ascent of the rivers. Each of the rivers in British Columbia possesses its own separate colony, and the runs to each exhibit differences in habit, method of growth and in period of maturity.

While the salmon are in the estuaries, their ascent to the rivers may be helped by the tide, but higher up they have to make their way unassisted. So great is their urge for reproduction that they display immense perseverence in negotiating obstacles such as weirs, falls, rapids, etc. They swim about 7 miles an hour in crowded schools, and enormous catches are made by one or other of the following methods.

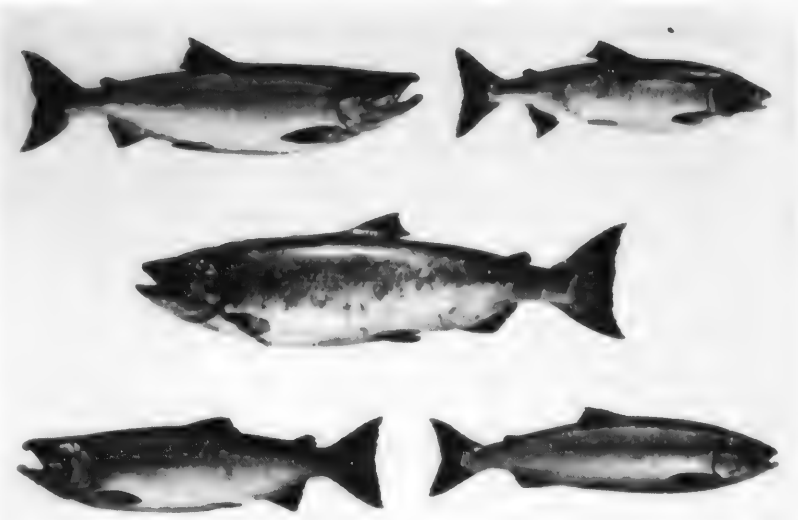
After spawning, all species of the Pacific salmon (both male and female) die, few surviving for more than a week or two.

Fishing methods

(1) Gill-netting. This is one of the oldest and most popular forms of apparatus in use for the capture of all varieties, but more particularly sockeye, cohoe and pinks.

(2) Trolling (hook and line). This method is used for capturing spring and cohoe, as these are the only species which habitually take a bait.

(3) Purse-seining. The three species taken in greatest numbers are pinks, chums and sockeye. Purse-seining, like all other types of commercial fishing in British Columbia, is rigidly regulated to prevent over-fishing and consequent depletion.



The five species of Pacific salmon. (*Left to right, top to bottom*): **Chum, Pink, Spring, Cohoe, and Sockeye.**

Artificial culture of salmon eggs

To maintain adequate supplies of any particular species of salmon for the fishing areas, artificial culture of the eggs has developed into a large and expanding industry. British Columbia has built and maintained a considerable number of these fisheries and some of them are the largest in the world.

The eggs and milt (male sperm) which are used for artificial propagation are obtained from the male and female salmon on their way up the streams and rivers to their natural spawning grounds. Thousands of eggs are hatched and the fry released in the streams where they are most needed.

Food value

The Minister of Fisheries has power to order special closures at any time when a check of the spawning beds shows that they have an inadequate population.

The Pacific salmon, which breeds prolifically, is caught in prime condition in enormous numbers. It can be satisfactorily canned or preserved, is highly nutritious and easily digested. The flesh is one of the best sources of high quality protein.

Table 1 shows the average analyses of the five species of canned Pacific salmon.

Canned salmon contains the important vitamins A, B_1 and D, and is particularly rich in mineral salts (calcium, phosphorus, iron, copper and manganese) and also contains an appreciable amount of iodine.

Table 1.—Composition of Pacific Salmon

Species	Total solids %	Fats %	Protein (N.X 6·25) %	Energy value (cal./lb.)	Phosphorus (mg./lb.)	Iodine (mg./lb.)
Sockeye	35·22	9·30	20·00	770	1,300	0·20
Spring	36·83	12·50	20·00	910	1,150	0·13
Cohoe ...	32·51	8·00	21·00	720	1,350	0·12
Pink	30·20	6·40	19·50	630	1,200	0·15
Chum	29·96	5·00	21·50	610	—	0·10

THE CANNING INDUSTRY

Hapgood, Hunt and Co. commenced canning salmon on the Pacific Coast of North America in 1860. The work was carried out in a large scow on the Sacramento River at Washington, Yolo County, California. In 1870 the first Canadian cannery was built and operated by Messrs. Hennessey, Loggie, Ewen and Wise, at Annieville, on the Fraser River just below New Westminster, British Columbia. In the same year a Captain Stamp established a second cannery at Sapperton, New Westminster.

Subsequently, more canneries were erected along the coast from California through Oregon, Washington and Puget Sound. In 1878, the North Pacific Trading and Packing Company started a salmon canning factory in Alaska. Other firms soon followed, these extending north to the Bering Sea.

Industry's growth

In 1900, there were 69 salmon canneries in British Columbia, but during 1917 the number had increased to 90. In 1928, it decreased to 30, and today there are about 24 canneries operating in the Province.

Two fish research stations are maintained on the Pacific Coast by the Federal Government, the Pacific Biological Station, located at Nanaimo, and the Fisheries Experimental Station at Vancouver.

The British Columbia Packers, Ltd., whose factory at Steveston, B.C., on Lulu Island, is described below, was founded in 1928 through the amalgamation with two of the leading fish-packing organisations on the Canadian Pacific coast, and later the assets of another packing company were acquired by the corporation.

The company's Imperial Plant at Steveston at the mouth of the Fraser River has undergone extensive modernisation and is one of the largest fish-producing units in the Commonwealth. The salmon cannery comprises 11 lines with a rated capacity of 9,500 cases in 8 hours. The company gives direct employment to 1,500 employees and in addition it serves and assists about 1,700 fishermen.

Table 2.—Comparison of Pacific Salmon with other Foods

Food	Total solids %	Fats %	Protein (N.X 6·25) %	Ash %	Calories per lb.
Salmon	36·40	13·40	21·60	1·40	965
Beef, round	33·30	9·00	23·00	1·30	805
Hens' eggs	26·90	11·70	13·70	1·00	760
Potatoes	24·50	0·20	2·00	1·00	440
Cow's milk	12·60	3·70	3·40	0·70	310
Cabbage	10·00	0·20	1·90	1·20	170

Table 3.—Vitamin D Content

Food	Vitamin D I.U./lb.
Canned salmon	1,700
Hens' eggs	186
Liver	180 to 225

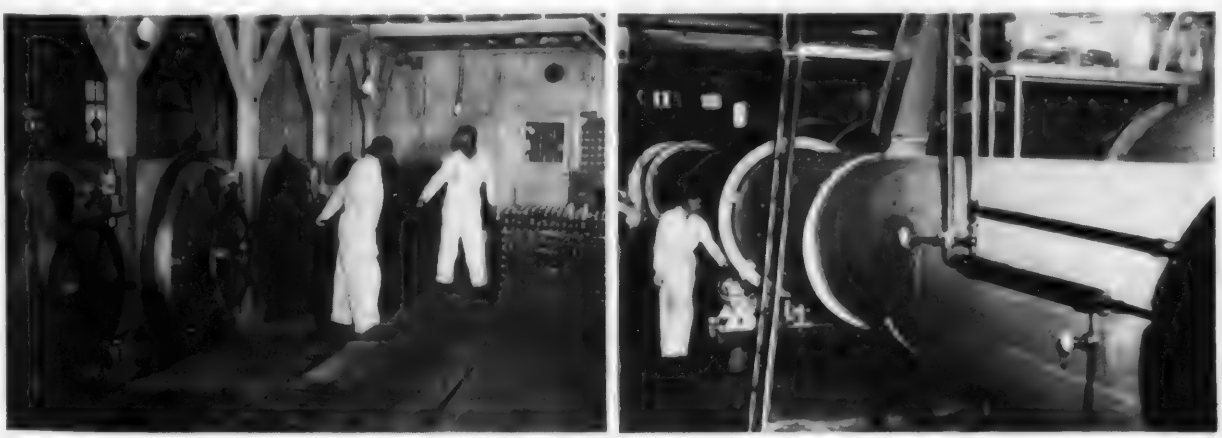
The sole agents in the U.K. for the *Clover Leaf* brand of salmon products exported by British Columbia Packers, Ltd., are the well-known importers, Macpherson Train and Co., Ltd., of Adelaide House, London Bridge, E.C.4.

Table 4 shows the quantities and value of canned salmon imported into the U.K. from British Columbia, Canada, during the past three years.

Table 5 shows the salmon packs of British Columbia during the past three years.

Transporting salmon to cannery

The comparatively short salmon season makes rapid transport from the fishing grounds neces-



(*Left*): **One of the canning retorts being unloaded.** (*Right*): **A rotary hot-air dryer which dries pressed fish.**

Table 4.—Salmon Imports from B.C. into U.K.

Year	Quantity cwts.	Value £
1957	89,212	2,680,446
1958	237,092	7,154,168
1959	217,171	7,078,592

sary to ensure that fresh fish are delivered in prime condition. Powerful, modern diesel-driven vessels, termed "packers," with roomy holds are used for the purpose.

THE STEVESTON CANNERY

On arrival of the packer at the cannery wharf the salmon are unloaded by an elevator on to a sorting belt. They are afterwards weighed and graded according to species and locality of capture, then passed down chutes to a series of water-tight bins sloping to one point. The fish in each bin is from the same area and of the same species. Usually a period of time is allowed to enable the fish to shrink, otherwise when packed much juice is formed and light weight cans may result. Certain species of salmon spoil more quickly than others.

The British Columbia Packers, Ltd., can all five species of salmon in varying degrees, as follows:

Sockeye and Pinks	nearly all
Cohoes	60%
Chums	50%
Springs	only a small percentage

Heading and gutting

When a bin of salmon is required for processing, water is added and the fish are water-flumed to the heading and gutting machine, known as the "iron chink." This ingenious machine for dressing salmon was first introduced into the industry at Fairhaven, Washington, B.C., in 1903 and not only cuts off the heads, fins and tails, but also splits open the belly and removes the internal organs. The "iron chink" is capable of dealing with 3,600 fish per hour.

The first operation is to cut off the head of the salmon, the body is then caught between two moving drums, which hold it firmly tail first and belly uppermost, the apparatus adjusting itself to the various sizes of the fish. A series of knives and saws then remove the fins and tail and split open the belly, and revolving brushes sweep away the viscera. Sprays of water automatically wash out the body cavity.

The machine is so arranged that the salmon is also "slimed," *i.e.*, the thick mucous, etc., covering the skin is removed. The heads and offal fall to the bottom of the machine and are collected and transported to the meal and oil plant.

The eviscerated salmon on leaving the "iron chink" are conveyed to the washing tanks. Here they are thoroughly cleansed in running water, trimmed and any blood or membranes remaining in the body cavities removed by women operators.

Inspection

The fish are then passed to the inspectors who grade out any of poor quality and not up to standard, or species that may have inadvertently entered the wrong bin. After inspection, the salmon are either conveyed in aluminium buggies for the ¼-lb. hand filling lines, or passed to holding bins for the high speed ½-lb. or 1-lb. automatic filling machines.

Automatic filling

The salmon from the holding bins are inspected by two women operators who afterwards feed the fish to the high speed filling machines, which deal with ½-lb. cans at the rate of 240 per minute or 14,400 per hour; or 1-lb. cans at the rate of 200 per minute or 12,000 per hour respectively.

The empty cans are fed into the machine down a chute from the floor above. As each enters it automatically receives an amount of salt from a receptacle adjusted to deliver the required quantity, viz.: for ½-lb. can ⅛ oz., and for 1-lb. can ¼ oz. At the same time a section of salmon from the cutter is passed into a measuring box having a capacity equal to that of the can to be filled. Any excess of fish is trimmed away by appropriately placed knives. A plunger

A deeply-laden packer returning to the cannery from the fishing grounds. This type of vessel carries 273,000 lb. of salmon.

(*Left*): **Workers feeding the "iron chink," an automatic filleting machine.** (*Right*): **A woman worker feeding the 1-lb. filling machine, the fill being checked by a foreman.**

forces the cylinder of salmon from the measuring box into the can and an accurately timed extractor permits the escape of air. As soon as the plunger and extractor are withdrawn the filled can is thrust on to an inspection table and thence by conveyor to the automatic weighing machine which is adjusted to reject any underweight or overweight cans. Four women operators inspect and correct the weight of the cans by the addition or subtraction of salmon and also remove any can which is considered poorly packed. The machine filled cans are then sealed, processed and washed, etc., in a similar manner to the hand filled ¼-lb. cans.

Cutting machine for hand filling

Salmon designated for the ¼-lb. lines are cut by a gang-knife machine to the required size. This consists of a wood vertical carrier with ledges or buckets operating on a chain. The buckets are wide enough to hold a salmon and are slotted in cross section through the ledges and outer casing to receive the gang knives. The carrier and knives operate independently on individual shafts. As the buckets come into a horizontal position an operator places a salmon on each as it passes. The fish is then carried on to the gang knives which cut it transversely into sections of the required size for ¼-lb. cans. The cutter shunts the tail pieces, etc., to one side and these are deposited into baskets.

The steaks of fish resulting from the above operation are conveyed by rubber belts to the hand fillers, who are highly trained women working under the supervision of an inspector. The employment is on a piece-work basis and an operator is capable of filling on an average five to seven cans a minute.

Protective clothing

All persons working in the factory are provided with white washable overalls and the women with green bandannas and hair nets; men supply their own head gear. All are provided with cotton or rubber gloves, depending on their particular needs.

Can sizes

The three legal standard size cans for salmon are as follows:

¼-lb. 3·01 × 1·06 in. Hand filled, 3¾ oz. net.

½-lb. 2·00 × 3·07 in. Machine filled, 7¾ oz. net.

1-lb. 3·01 × 4·11 in. Machine filled, 15½ oz. net.

The ends of the cans are lacquered with 25ZA lacquer, but the walls are of clear electrolyte tin plate. They are supplied by the American Can Company.

Hand packing of cans

In hand packing of ¼-lb. cans the women operators stand in front of a specially constructed long table and are supplied, as stated, with the cut salmon sections and the empty ¼-lb. cans by chute from can loft on the floor above. The operators are required to fill these to a specified weight and use standard methods of packing. The sections of fish are inserted with the skin side towards the inner surface of the can. In a busy season 30 to 40 women would be employed on two lines. On an average they would produce 140 filled cans per minute, or 7,200 per hour.

The cans from the packing tables travel on a chain belt past the automatic dry salter where 1/12 oz. of fishery salt is added to

Table 5.—Salmon Packs of B.C.

(48 *lb. cases*)

Species	1957	1958	1959
Sockeye	228,452	1,074,303	256,420
Springs	12,584½	10,705	15,760
Pinks	210,895½	131,528½	224,163
Cohoe	752,454	451,528	458,229
Chums	245,273½	230,631	133,973

each can. This fishery grade three-quarter ground salt, which is chemically analysed in the laboratory, must be stored under clean, dry and warm conditions. Any moisture in the salt is liable to clog the dispensing machine.

The cans are afterwards checked for correct weight on an automatic weighing machine, which rejects light weight cans. The checkers adjust the weight by adding or subtracting salmon as required.

Exhausting and sealing

After inspection the cans pass to the clincher where the lids are crimped on loosely and then enter the combined exhausting and sealing machine. The latter consists of a large vacuum chamber from which part of the air is withdrawn by pumps. The cans with the tops loosely rolled on pass into the chamber through ports or pockets in a carefully synchronised, revolving air-tight valve. The air is withdrawn from the cans and the seams rolled tightly on inside the chamber after which they leave through exit valves. The cans are hermetically sealed under a vacuum of 15 to 20 in. per lb.

The lid-clinching machine has a coder attached which, according to legislation, must give the species of salmon, plant number, and day codes. The cannery code is registered with the Canadian Department of Fisheries.

From the vacuum closing machine the sealed cans pass through a washer and are afterwards stacked on "cooler" trays, each holding 168 ¼-lb. cans. The trays are placed in the retort cars each holding 16 trays for processing.

Retorts

There are 10 horizontal steam pressured and temperature controlled retorts in actual use, each accommodating 8 to 10 cars, approximately 26,800 ¼-lb., 17,420 ½-lb., or 10,080 1-lb. cans. The loaded cars are wheeled into the retort, the door closed and sealed. Live steam is turned on and the valves left open for air to escape. When the temperature reaches 212°F. the valves are closed and the retort brought up to the required processing temperature and pressure, as follows:

¼-lb.	75 min. at 242°F. at 10 p.s.i.
½-lb.	80 min. at 242°F. at 10 p.s.i.
1-lb.	90 min. at 242°F. at 10 p.s.i.

The coming up time in all instances is 20 minutes and the coming down time 10 minutes. After processing the cans are air cooled.

Washing the cans

The trays of cans are then passed through the washing tank, containing a detergent solution (sodium metasilicate) and scrubbed with nylon brushes; then transferred to another tank where they are washed and sprayed with hot water. Leaky or dented cans, etc., are removed during the process. In some canneries cold water is sprayed on to the cans to cool them.

Control

The cannery foreman is supplied with a copy of the Company's Quality Control Specifications governing canned salmon, which deals with the following: raw material, cleaning and butchering, filling and patching, salt control, weight control, can closing, coding, can cleansing, retorting and cooling, sanitation, damage to cans and sampling. All the various stages during canning, etc., in the factory are supervised by foremen, charge hands and the quality control department. Samples of the day's pack are taken for inspection by the plant superintendent, the quality control department and the cannery foremen. The canned salmon sales department's representative also sample each batch of salmon independently for label selection.

All books reviewed in FOOD MANUFACTURE as well as any other scientific or technical book may be obtained from:
Technical Books
308, Euston Road
London, N.W.1.
Tel.: Euston 5911.
Prompt attention is given to all orders.

Labelling

This is carried out by machine (*New-way Knapp*), as follows:

125 cases per hr.: 400 cans: ¼-lb. per min.
250 cases per hr.: 400 cans: ½-lb. per min.
310 cases per hr.: 240 cans: 1-lb. per min.

Disposal of waste

The offal is collected and taken to a reduction plant where it is pressed and dried and afterwards utilised as mink food, meal for cattle, poultry, etc., and also for medical research on certain components. A limited quantity of "chum" roe is incorporated in salmon caviar.

Regarding expressed salmon oil, a small amount is used in the manufacture of coloured soaps, but the bulk is blended with other oils for use in feeding stuffs, on account of its high vitamin content. Over a season 40,000 to 50,000 gallons of salmon oil may be available.

OTHER PRESERVATION METHODS

1. Freezing

Salmon are not available in British Columbia in large quantities at all seasons of the year, consequently, when the fish are plentiful, considerable numbers are frozen and held in cold storage for export when required. Spring, cohoe and chum are the species usually frozen. They must be fresh, in prime condition and undamaged.

The salmon, which are usually 6 to 15 lb. in weight, are decapitated, dressed and afterwards thoroughly washed in clean running water. They are then carefully laid on metal sheets and placed in the double-ended sharp freezer room. The temperature is lowered and then ranges from −35 to −45°F., usually −40°F. The time taken to freeze a 3-inch thick salmon is about 6 hours.

The fish are then glazed by either dipping them into a tank of clean water or spraying them with water. When removed they are

(*Left*): **Fish products for oil extraction are digested in this cooker, the crude oil-containing liquor afterwards being refined.** (*Right*): **Part of the salmon oil storage tanks of British Columbia Packers.**

covered with a thin coating of ice. The fish may be dipped or sprayed several times in order to be sufficiently glazed. This coating of ice prevents the fish drying out, losing its flavour and also yellowing during storage.

The frozen fish are afterwards removed to the cold storage room which is maintained at a temperature of −15°F. Research has shown that this is about the ideal temperature for the storage of fish of a fatty nature, as salmon in which rancidity tends to develop. If the salmon are being held in cold storage for fairly long periods it may be necessary to reglaze them.

When the fish are required for transportation they are removed from the storage room, graded according to size, and each is wrapped in a suitable material. They are packed in paper-lined wooden boxes, each holding about 250 lb. of fish, and loaded into the refrigerators of ocean vessels, or into pre-cooled refrigeration cars for transit by rail.

2. *Mild Curing*

This method, which requires expert knowledge and technique, has been developed for the purpose of curing the fish very mildly with salt, to meet the demand of European fish-smokers. The species generally used for mild-cure is spring salmon. The fish must be in prime condition and on delivery at the plant are graded according to size.

The head of the salmon is cut off, leaving a portion of the bony structure for attaching the hooks when the fish is smoked. After being dressed and cleaned the fish is skilfully split into two sides, the knife following each side of the backbone closely, so that none of the flesh is wasted or presents a ragged appearance. No flesh should be left on the bone but a line of fat will show down the centre, which improves the appearance and adds to the value of the salmon. The sides are washed in running water and then chilled in weak brine solution containing crushed ice. This coagulates and brings to the surface any blood remaining in the small blood vessels. When chilled each side is pressed and scraped. The skin is punctured in several places by short cuts to facilitate salting. Great care must be exercised in handling the newly split sides as they are very tender and easily broken or bruised.

Each side of salmon is placed in a wooden trough and rolled in fine salt, with which it is also covered. In some instances, the sides are placed on a table, skin side down, on which salt has been spread and this is then gently rubbed into the flesh.

A quantity of salt is placed in the bottom of a tierce (fir or spruce barrel holding about 800 lb. of fish) and the sides of salmon carefully packed in it skin downwards, layer upon layer, with a quantity of salt between each, until full. The top layer is sprinkled with a light layer of salt and the head of the tierce put in. About 85 to 100 lb. of salt are required for 800 lb. of salmon. The tierce is then turned on its side bunghole uppermost and pickle (brine solution) poured in until it is full. The bung is then replaced. The pickle is made to a strength of 90% of fishery salt, broken ice being added if the weather is warm. It should be strained before use to remove froth and settlement. The strength of the brine usually weakens to about 70% during the first ten days of curing but after the salmon is repacked it should not fall below 85% and will retain this strength for some time.

The tierces are rolled inside a cold store where they are racked and maintained at a temperature of from 35 to 38°F. for at least 20 days, but not more than 90 days. Shrinkage during the first packing is about 30%

The sides of the salmon are taken out of the tierces and cleansed to remove all slime and salt and afterwards washed in ice water or, in the case of soft fish, in iced pickle. They are then repacked in the tierces (no salt is added) and the latter filled with ice-cold pickle.

Fish which have been properly cured should be kept in good condition for some months, provided the barrels are sound, kept full of pickle and maintained at comparatively low temperature.

Vibratory Screening – *Principles and practice*

By O. A. Goulden, A.M.I.E.E., and F. G. Smith

How to turn vibration to good effect is the theme of this article, which describes the applications of different types of vibratory screens and their underlying principles.

IT is clear that to meet the force of competition as well as maintaining high standards of hygiene and cleanliness, food products must not only be pure and wholesome but must appear to be so.

To achieve these standards in granular materials some form of screening or grading must usually take place during the process of converting the raw material which often arrives from overseas in sacks or the hold of a ship. Let us therefore analyse the classes of screening that may be involved and then study suitable specifications for the most efficient equipment to provide for the requirements.

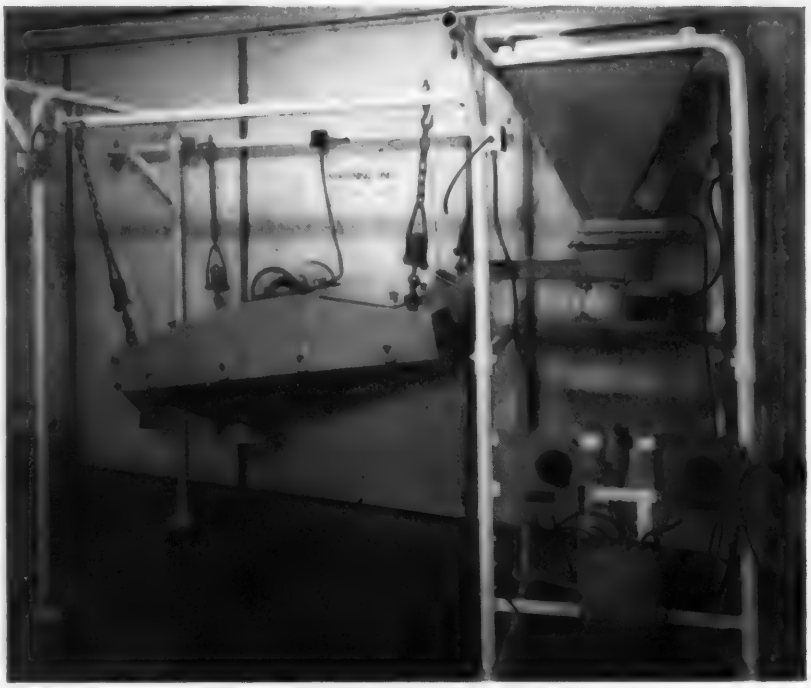


Fig. 1. Typical vibrating screen installation.

Scalping

Raw material can be contaminated with metal scale, pieces of string, sacking, hair and many other foreign bodies which, because they are larger or smaller than the granular material itself, are removed with a trash or scalping machine. The mesh is large enough to allow the uninterrupted passage of the material, but of a size to retain the foreign matter on the screen deck, or vice-versa. Ferrous contamination is removed by some form of magnetic separation before screening.

Grading and sizing

This involves the rejection of oversize or undersize material which is not required in the process. Very often such a screen is used in conjunction with some form of breaker or crusher, the oversize material from the top deck being fed into the crusher before rejoining the main stream. The undersize material is rejected through the lower deck and discharged into a hopper either for scrap or use in another process.

Dust removal

This important operation is usually employed before packing products, such as biscuits, wafers and certain types of food tablets. One method of dust removal is to feed the product on to a screening deck which is formed from a flat perforated plate which is under vibration. The dust is removed and passes through the perforations.

Very good results have been obtained with tablets to which the dust clings tenaciously by having two decks in tandem, the second stepped below the first so that the tablets turn over as they pass from one deck to the other.

Surplus water removal

In many products it is necessary to wash ingredients during processing. To facilitate washing and to accelerate the process it is often desirable to pass the water or effluent with the material through a dewatering screen. The mesh is sufficiently small to retain the matter and to convey it to a discharge chute in a partially dry state whilst the liquid is diverted to a drain or a filtration plant before being recirculated.

Types of screen

We can now consider the machines which are employed to per-

form these various applications of screening. For all the above forms of screening the vibratory screen is used. It can incorporate one or two decks so that scalping and grading may be carried out together, or alternatively, triple grading can be achieved.

The basic components of this type of screen are a main body, inlet and discharge chutes, undersceen hopper and a frame on which the mesh or meshes are fitted. An essential feature of this frame must be its easy removal for replacement of mesh. Most operators prefer to hold in stock a complete frame with mesh already fitted, thus reducing the standing idle period to a minimum.

There are three main sources of motive power: (*a*) the first consists of an eccentric shaft driven by an electric motor through vee belts and pulleys; (*b*) electromagnetic units; or (*c*) a rotary electric vibrator which is a totally enclosed unit. A typical vibrating screen installation is illustrated in Fig. 1.

It is sometimes necessary to convey the material from a storage bunker to some other piece of mechanical handling equipment, *e.g.* a belt conveyor, and screen it in transit. For this application a vibrating trough in which is incorporated a screen deck is sometimes used, the large material being carried along the top deck and the fines in the bottom of the trough. These machines are powered by either one or several vibrator units, magnetic or rotary electric, according to the length of trough required.

Fig. 2. Bowl screen for separating and grading small batches of material.

Machines for small batches

We have dealt so far with the large capacity machine handling several tons per hour, but for small batches there are three other types of screen which are in general use.

Firstly, the bowl screen, which can be used for separation and grading of all sizes of materials. The advantage of these machines is the small power consumption and the fact that any size mesh can be readily clamped in position to suit operational requirements. Fig. 2 illustrates this type of screen.

Fig. 3. Typical gyratory screen for small batches, with an oblique vibrating action coupled with a slow circular motion.

For materials which are difficult to screen through very fine meshes a slightly different technique is employed.

The type is designated a gyratory screen. The screening action is that of an oblique vibrating action coupled with a slow circular motion. The former action reduces blinding of the mesh and the latter moves the material over the mesh surface giving rapid screening action. Fig. 3 illustrates a typical gyratory screen.

Fig. 4. Test sieve shaker for analytical and experimental work.

Finally for the works chemist and research staff, there is the test sieve shaker (Fig. 4) which is invaluable for analysis and experimental work. Designed to vibrate a nest of test sieves to BSS.410, this piece of equipment is necessary for the laboratory where strict analysis control is undertaken.

It must be emphasised that each requirement must be treated on its own merits. No two materials have the same screening characteristics and size of granules. Temperature and moisture content all play their parts in making life for the screening engineer more difficult.

Problems of the screen designer

In deciding the particular type of screen, the designer is faced with a multitude of problems, the most important of which are:

(1) The capacity required both over and through the screen deck.

This will decide the screening area required for the specific duty.

(2) Material of construction. In food screening protection from contamination is obviously of major importance. In certain cases with dry material a stainless steel mesh or nylon coated mild steel mesh with a mild steel screen body is adequate. However, with any suspicion of dampness in the atmosphere or inherent in the material it is usual for the carcase to be fabricated from stainless steel or other suitable anti-corrosive material, the initial higher cost being justified by the quality of product produced.

(3) Frequency of vibration. The general rule is that the size of particles is proportional to the amplitude and inversely proportional to the frequency. Thus most fine powdery materials react better to high frequency (3,000 r.p.m.), small amplitude vibration while lumpy materials require greater amplitudes (1,500 r.p.m.).

(4) The problem of installation. This is usually dictated by space available and proximity of existing plant.

The normal method of support is to suspend from above through shock absorbing hangers, but floor mounted screens with a subframe and rubber bushes are usually available.

(5) Size of mesh. This will, of course, be dictated by the size of product required. However, the size of mesh brings its own problems. The smaller meshes are quite fragile compared with the heavier ones and also they are more susceptible to blinding.

To overcome these problems several methods are in use. An excellent remedy is to place under the fine mesh a perforated plate or another mesh of heavier construction. This will vibrate with a different natural frequency to the lighter one above and will perform the duties of helping it to clear by beating against it. Also it will afford support.

Different meshes and materials require different degrees of tensioning. This is best determined on site with the material which is required to be screened.

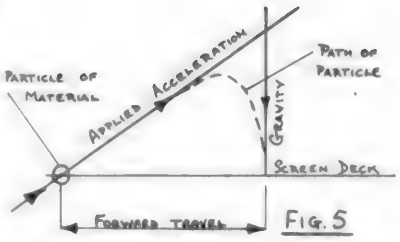


FIG. 5

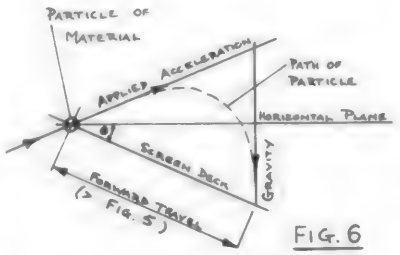


FIG. 6

For heavier meshes transverse tensioning only is usually sufficient, while with some of the lighter meshes a combined lateral and longitudinal method is employed. In dewatering screens a roller type, cam operated, is sometimes used.

Dust nuisance

Where very dusty fine materials are being screened it is the usual practice to make the inlet and outlet chutes and the screen body of totally enclosed, dust-tight construction.

Principles of screening and feeding

If one looks at the material flowing over a screen deck or feeder trough it appears to move quite smoothly, almost as if it is pouring through or over it, and perhaps the uninitiated is apt to ask why and how a material can be made to flow along a perfectly flat, or even up an inclined plane.

If we imagine a single granule or piece of material standing on a flat deck being suddenly given a vibrating pulse in an upward and forward direction, the granule will continue to move upwards and forwards until such time as the gravitational force will take over and bring the particle back to the deck in a steepening arc, in the manner of any projectile. It will be seen from Fig. 5 that it has moved along the deck or trough away from the source of vibration.

This process is repeated according to the size and weight of the material granules, say between 1,500 and 3,000 times a minute. It will now be seen as mentioned previously, under the heading "Problems of the screen designer," para. 3, frequency of vibration, why it is necessary to vary the amplitude of vibration for different materials, *i.e.* the heavier the material the smaller the frequency and greater must the amplitude be. It also follows that to accelerate a feed rate for a given material a sloping deck or trough will give higher rates than a horizontal one with equal vibration. See Fig. 6.

However, although we can accomplish higher output by merely inclining the deck for feeding, when it is desired to carry out screening or sieving operations it may well be that our screening efficiency is impaired by passing the material too quickly over the mesh. Therefore a happy medium must be found between angle of deck and amplitude of vibration for any particular material to give a high feed rate coupled with efficient screening.

As has already been stated, and no apologies are thought necessary for again stressing this important point, the screen must be correctly tensioned and set up on site with the material to be used, before really satisfactory results can be achieved.

* * *

It has been shown that screening in the food industry alone covers a large number of functions and materials. Manufacturers do not design a range of screens for sugar, or starch, or flour, they tend to produce a range of carcase frame sizes to which are fitted various meshes and various power units for a specific throughput and material.

In order to determine the most suitable combination, they have available a standard carcase to which can be fitted a range of meshes and power units.

New Machines and Methods in the Jam Industry

Constant research to improve quality

By J. M. Colquhoun*

Developments in the jam and preserves industry since our last review in April 1958 are described in this article by a member of the staff of the B.F.M.I.R.A. Despite a continuing decline in home production, exports hold their own, an encouraging indication of the quality of the industry's products. Research into fruit quality, and new machines and packs for the manufacturer, are among the topics dealt with.

NO basic changes have occurred in jam manufacturing processes in recent years. The traditional character of British jam is based upon a batch boiling process and might well be altered by adoption of continuous boiling techniques. The steady export market for British jam and marmalades indicates that appreciation of these typical products is not confined to the British palate.

Improvements and innovations which have been introduced recently have been designed to facilitate and speed up the traditional manufacturing procedures. Such changes are described under the section dealing with machinery.

During past years the use of hermetic sealing has become almost universal and the important development in this type of sealing has been the use of steam injection to effect sterilisation of the head space.

Little change has occurred in relation to raw materials used in jam production. Some manufacturers are showing interest in the substitution of glucose for a portion of the sugar normally used. The use of frozen pulp rather than preserved fruit is increasing but the capital outlay involved is a limiting factor.

More attractive packaging

There is evidence of a trend towards more attractive packaging and labelling. Use is being made of screw-caps, jars of more modern shape, printed cans and rigid plastic containers. This last form of packaging, however, is basically limited to packs for the restaurant trade.

For bulk packs, polythene bags in cartons are beginning to be used. Light weight glassware has been introduced and is being successfully used with a smaller neck finish.

PRODUCTION

Unfortunately it is not possible to report any reversal in the trend of falling production of preserves in the U.K., which was discussed in considerable detail in the previous review. The figures for the current period are shown in Table I. The recent decline in marmalade production is a notable feature since in previous years marmalade has tended to maintain its production more effectively than other preserves.

Tasting strawberry jam at the B.F.M.I.R.A. laboratories as part of a programme to evaluate the season's strawberry crop.

Table I. Preserves Produced in the U.K., 1957 to November, 1960

(by courtesy of the Food Manufacturers' Federation)

	1957 '000 *tons*	1958 '000 *tons*	1959 '000 *tons*	*First 11 months* 1960 '000 *tons*
Jams ...	137·2	147·2	134·2	170·1
Marmalade ...	77·0	76·7	71·5	
Mincemeat ...	19·4	20·8	19·4	17·2
Fruit Curd ...	11·5	11·8	8·9	8·3
Total ...	245·1	255·5	234·0	195·6

Declining home consumption

Possible explanations for the continuing decline in production were considered in the previous review and some methods for influencing this situation were discussed.

* British Food Manufacturing Industries' Research Association, Leatherhead, Surrey.

Table II. Preserves Exported by the U.K., 1958 to November, 1960

(by courtesy of the Food Manufacturers' Federation)

	1958		1959		First 11 months 1960	
	cwt.	£	cwt.	£	cwt.	£
Jams, Jellies and Fruit Pulp containing sugar	96,317	811,865	108,371	876,904	96,226	751,952
Marmalade	93,694	696,035	99,284	712,188	89,673	632,290

It can hardly be maintained that the market is saturated since according to the latest figures available[1] only 1·82 ounces of jams, jellies and fruit curds and 1·09 ounces of marmalade per week were consumed per person in the U.K. in 1957.

It is hoped that the concern of the industry to maintain and better the quality of its products, the increasing introduction of more modern machinery and lay-out in factories and the growth and improvement of recent advertising will lead to an increase in consumption of preserves. The use of more attractive and imaginative labelling and packaging may also be expected to result in increased sales.

" Polypot " plastic containers by the Metal Box Co.

Export trade steady

The decline in production figures is not paralleled by a similar drop in export figures as will be seen from Table II. It appears that there are steady markets for British preserves abroad, specially for those of high quality and there is no reason to assume that these markets could not be increasingly developed. The emerging trend towards more imaginative packaging and labelling should pay dividends, particularly in regard to the American markets. It is generally accepted that in the U.S.A. the agressiveness of advertising is a potent factor in relation to sales but the writer is not competent to comment on the quality of British advertising in foreign markets.

RAW MATERIAL

The relatively dry, warm summer of 1959 resulted in a high yield of strawberries in England and Wales and of raspberries in Scotland, as will be seen from Table III. The earliness of the picking season in Scotland enabled the bulk of the Scottish soft fruit crops to escape serious epidemics of grey mould.

The increase in the crop, partly due to the favourable weather and also to increased planting, caused some Scottish growers to have difficulty in disposing of raspberries towards the end of the season. During the wet season in 1960 the tonnage of strawberries in England and Wales was lower than usual.

Promising strawberry yields

Strawberry varieties which have been most widely grown include Huxley, Royal Sovereign, Cambridge Favourite, Talisman and Redgauntlet. It was hoped that these last two varieties would form a suitable replacement for Auchincruive Climax. They have not, however, proved as acceptable for jam manufacture as Climax although they appear to be cropping well. Phenomenal yields are reported[2] from experimental trials in Scotland in 1959 in which a half acre block of Talisman (in its fifth season) yielded 4½ tons of saleable fruit and a one acre block of Redgauntlet (in its third season) over 6 tons.

Table III. Estimated Production of Soft Fruit in England and Wales and in Scotland, 1958-1960

(by courtesy of the Ministry of Agriculture, Fisheries and Food)

	1958		1959		1960 (*forecast*)	
	England and Wales '000 *tons*	*Scotland* '000 *tons*	*England and Wales* '000 *tons*	*Scotland* '000 *tons*	*England and Wales* '000 *tons*	*Scotland* '000 *tons*
Strawberries	27·1	1·9	32·6	2·7	24·3	
Raspberries	3·6	10·5	3·8	14·2	3·1	Figures
Blackcurrants	20·9	0·1	15·9	0·2	19·2	not yet
Gooseberries	15·8	0·5	11·3	0·7	11·9	available
Red and White Currants	1·3	—	1·4	—	1·3	
Blackcurrants and Loganberries	1·9	—	2·7	—	2·7	
Mixed and other kinds of soft fruit	—	0·7	—	1·3	—	
Total	70·6	13·7	67·7	19·1	62·5	

"Roltop" cans with "Gardex" caps, made by Metal Box.

Of greater concern to the preserves trade than the quantity of strawberries harvested in Britain is the lack of suitable varieties. Characteristics of strawberries which are considered desirable for jam are not necessarily those which are sought after by growers and by the fresh fruit market. Cropping quality, hardiness and resistance to disease are the factors of primary concern to growers whereas the dessert trade is interested in large, firm and attractive berries.

The qualities of greatest importance to jam manufacturers are medium size, ease of plugging, good colour and flavour and the ability to maintain whole fruit structure without excessive toughness during both boiling into jam and preliminary preservation.

These varying requirements are not all necessarily antagonistic and an encouraging development during the past few years has been the holding of a series of meetings at which strawberry breeders, growers and processors have been represented. It is hoped that liaison of this type may lead to the selection of a variety which would satisfy the requirements of the various users (the preserve, canning and quick freezing industries) and also fulfil the needs of growers and the fresh fruit market.

Imported pulp

The amount of strawberries preserved without sugar (other than tinned and bottled and including frozen) imported from the Continent totalled 140,002 cwt. in 1958, 141,628 cwt. in 1959 and 136,085 cwt. during the first 11 months of 1960.* The 1960 figure is comparable with that for the same period in 1959 (137,461 cwt.) and slightly higher than the amount (130,897 cwt.) imported during the first 11 months of 1958.

Although the total amounts imported during 1959 and 1960 were comparable, mandatory conditions imposed a change of pattern regarding the countries from which they were bought. Only half the quantity which was imported from Bulgaria in 1959 was bought in 1960 and this decrease was balanced by an increase of 11,000 cwt. from the Netherlands and of 7,000 cwt. from Poland.

* Figures supplied by courtesy of the Statistical Department of the Food Manufacturers' Federation.

Sugar

The two main factors affecting the home trade price of sugar, the Commonwealth Sugar Agreement for 1960 and the guaranteed price of sugar beet payable in respect of the 1960-61 crop, have resulted in a market price lower than that for the previous year. This downward trend has been welcomed by manufacturers as the cost of sugar in the U.K. had been of concern.

RESEARCH

"Blind" seeds in raspberry jam

A recent report of work carried out at the B.F.M.I.R.A.[3] indicates factors arising during the handling and processing of the fruit which tend to minimise the subsequent development of blind seeds in the jam.

The occurrence of this phenomenon is essentially a variable one and the basic factors affecting its incidence have not yet been established. Susceptibility to blindness has been shown to be linked with variety to some extent.

Fruit suitability

It has already been noted that the lack of a variety of strawberry which is particularly suited to jam manufacture continues to be of deep concern to the industry. In conjunction with horticultural research stations, annual trials are carried out to determine the suitability of new varieties for jam manufacture. Recent reports [4, 5] indicate that a satisfactory replacement for Climax has not yet been found.

Effect of fungicides and weedkillers on flavour

Jam manufacturers are very aware of the possibility of taint arising from horticultural treatments, and tests have been carried out at the B.F.M.I.R.A.[6] which show that certain fungicides and weedkillers can give rise to detectable flavour differences between jams prepared from treated fruits and from corresponding untreated controls. Such a difference in flavour has been particularly noted when strawberries have been treated with captan.[7]

Gas storage of blackcurrants

Storage tests on blackcurrants under varying conditions were carried out by the Ditton Laboratory and the degree of mould contamination was assessed by the B.F.M.I.R.A. Results indicated[8] that a high concentration of carbon dioxide in the storage atmosphere greatly retarded the development of fungal organisms and that blackcurrants could be stored satisfactorily for at least 8 weeks under such conditions. By such means, it is therefore possible to lengthen the period during which fresh blackcurrants are available to jam manufacturers.

MACHINERY

Strawberry huller and washer

The *Gabinel* automatic strawberry huller (the Guddie huller) which is distributed in this country by W. J. Hart and Sons (London), Ltd., is reported to be widely used in the U.S.A. It combines hulling (*i.e.*, plugging) and washing the berries and its capacity ranges from 1,200-2,400 quarts per hour, depending on size. It is claimed that less damage is caused to berries by this machine than when they are plugged by hand and that although the efficiency of the machine varies with the quality and variety of the berry, efficiencies of up to 95% have been reported.

Cooling vessel

A 110-gallon stainless steel vessel for cooling high boiled confectionery jam has recently been produced by William Brierley, Collier and Hartley, Ltd. The vessel is used for reducing the temperature of the jam from approximately 232°F. to 180°F. and automatically holds it at this temperature. Approximately 590 lb. of jam per hour can be dealt with.

The Bertand single nozzle volumetric filling machine. (*Courtesy W. J. Hart and Sons (London) Ltd.*)

Filling machines

A German firm, Ganzhorn and Stirn, Schwaebish Hall have developed a high speed filling machine, the *Gasti* (see illustration) for jam and marmalade which is distributed in the U.K. and Eire by Ideal Packaging, Ltd. This machine has a rated capacity of 12,000 jars per hour, reducable to 3,000 jars hourly if required.

W. J. Hart and Sons (London), Ltd., are the distributors of a smaller (single nozzle) volumetric filling machine of French manufacture which is capable of filling up to 2,160 containers per hour or up to 4,000-8,000 if the number of distributing nozzles is increased and if used with an automatic feed. This machine strips down easily for cleaning and operates silently.

Jam finishing

A number of operations have been combined by Robert Kellie and Son, Ltd., to increase automation in jam production. The key machine in the finishing line is the Kellie *Hydroseal*, a steriliser and cooler which has an intake of 120 jars per minute and a holding capacity of 4,350 jars. The combined functions of sterilisation, formation of vacuum and cooling take 33 minutes. The *Hydroseal* is lined up with filling and capping machines, such as the 11 FP Kellie filling machine also with a capacity of 120 jars per minute and at the finishing end with a jar drying conveyor and a labelling machine.

The use of such a finishing line allows one factory to have cartons of jam ready for dispatch 55 minutes after receiving the fresh fruit.

PACKAGING

Lightweight glass jars

The design of jam jars has undergone radical alterations from the thick green glass type used in the early 1900s. The 1920 version had a thick neck ring and an uneven distribution of glass in the base. Improvements to this design produced the type common in 1945 which weighed 9½ ounces and further modifications resulted in a 7 ounce jar in 1947. By careful attention to design it has been possible to make a further substantial reduction in weight and yet maintain a satisfactory margin of strength as seen in the 1960 version which weighs under 5½ ounces.

The effect of reducing the weight of jars is of obvious importance in relation to transportation costs. Lightweight jars are also less expensive to manufacture; in addition to requiring less glass, a more important factor is that less time is necessary for their production as they are moulded more quickly than heavier ones.

Jam can

A new can with a *Gardex* cap (see illustration) which is expected to be used principally for jam has been developed by the Metal Box Co., Ltd. It is available in 1 lb. and 1½ lb. sizes but other sizes can also be made.

The *Roltop* can has an outward curl at the top which is specially designed to take a *Gardex* cap.

The outstanding advantage of the *Roltop* can is that it is unbreakable and its low bulk appreciably reduces transport costs. Another feature is that labelling is not necessary as the cans may be printed

in durable colours. They have an internal protective coating and may be re-closed by replacing the lid. They are suitable for closing with or without vacuum. A machine for closing these cans, C.M.3/G. capper with vapour sealing (steam injection) equipment and can feed has also been produced by the Metal Box Co.

Plastic containers

Polypots, polystyrene pots, are produced by the Metal Box Co. who have also developed the M.B. No. 1 Unit Filler and Capper for automatically filling and capping miniature sized *Polypots*. A machine for handling larger sizes is under development. An aluminium *Garda* cap, a polythene snap-on cap or a paper cap may be used with these containers which are available in transparent or opaque colours and may be printed.

Vacuum screw closure

A vacuum screw closure, the *Omnia-S*, has recently been developed, which can be applied with standard sealing machinery. This cap is suitable for the sealing of products filled hot to give a vacuum after cooling or for the sealing of hot or cold filled products in conjunction with steam injection to produce an immediate vacuum. It can also be used for cold products and a vacuum may be created subsequently by use of a vacuum chamber or it can be used for sealing products prior to processing.

Vacuum cap

The Metal Box Co., Ltd., has introduced the *Gardex* cap, which is an improved version of the *Garda* cap, for vacuum packing jam, preserves, various pickles, etc.

It gives a more secure closure as it is crimped more tightly to the jar although retaining the same ease of opening as the *Garda* cap. The serrations around the edge have been reduced to a minimum and the cap is thus easier to handle and feed automatically and also the appearance is considered to be neater. This has been done by incorporating fewer slots in the rim and reducing their depth and width so that the cap appears to have a plain curled edge.

Tests have shown that improved vacuum retention and a lower spoilage rate result from the use of these caps. They may also be stored more compactly since they nest more closely.

The range of closing machines used for the *Garda* cap are suitable for *Gardex* caps with the addition of new closing heads of a simplified type.

A Kellie "Hydroseal" unit in a jam factory. The filling unit is on the right, sterilising and cooling unit centre and left.

Labelling machines

Newman Labelling Machines, Ltd., have improved designs to allow labels of $5\frac{5}{8}$ inches wide to be applied to 2 lb. jam jars (Model 24A) and to operate at 60 labellings per minute (Model 25).

The "Gasti" high-speed jam filling machine.

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The Meat Industry during 1960–I

Ups and downs, but solid progress

By F. J. Mallion, M.R.S.H., M.Inst.M.

In spite of setbacks caused by Foot and Mouth Disease at home and fluctuations in supplies from abroad, the Meat Industry continues to show steady progress, particularly in the sphere of technology, as this review describes.

WHILST the year 1960 saw prolonged strikes, both in Britain and Argentina, which seriously threatened meat supplies, undoubtedly the year will be remembered for the unfortunate epidemic of foot and mouth disease which flared up in early November and continued beyond the turn of the year. The epidemic was the worst in Britain since 1952 and has been estimated as having cost £1 million in compensation (being by far the highest amount paid in recent years) and resulted in the slaughter of 42,000 head of livestock.

Foot and mouth disease

Foot and mouth disease is an acute, infectious disease which causes high fever in farm animals, followed by the development of vesicles or blisters. The disease is caused by a virus, of which there are at least three European types, each producing similar symptoms, and it is probably more infectious than any other disease affecting man or animals. Incubation period varies between one and ten days, though, under natural conditions, the average time is three to six days. It is rarely fatal except in the case of very young stock, but the illness is so severe that fattening animals become emaciated and animals, such as dairy cattle, show a markedly reduced milk yield, at least until the next lactation. Among farm stock, cattle, sheep, pigs and goats are susceptible, though other cloven-footed animals may also contract the disease.

In Great Britain, where the disease arises only as a result of imported infection, the accepted policy is to slaughter all affected stock and those which have been exposed to infection. The success of this slaughter policy lies in early notification to the Authorities. (The disease is notifiable under the Diseases of Animals Acts, Foot and Mouth Disease Order of 1928 and amendments.)

Britain accepts the slaughter policy as being the only effective means so far readily available for preventing the disease from obtaining a firm hold in this country. The disease is world-wide in its incidence, and, whilst the U.S.A., Canada, Australia and New Zealand enjoy freedom from it, in European and Latin-American countries it is endemic. The toll taken by the disease in European countries is enormous in the death of animals and loss of production generally. Whilst vaccines are available, the Departmental Committee (Sir Ernest Gower 1952) which made an exhaustive enquiry into foot and mouth disease, estimated that the annual cost of vaccination of farm livestock would not be less than £24 million and might be as much as £56 million. These estimated figures must be set against the total of £2½ million paid in compensation in 1952, the worst epidemic of recent times. The number of animals slaughtered then was five times as great as the average for the last 25 years.

Causative agents in outbreaks of foot and mouth disease have on occasions been traced to infected imported South American carcase meats. Last year (1959) in efforts to minimise the risk of outbreaks from this source, the British Government made an Order (Importation of Carcass and Animal Products (Amendment) Order 1959) which requires that every consignment of meat and edible offal imported into the U.K. from South American countries be certified by an authorised officer of the government of the country of origin, as having come from an approved slaughtering centre. This Order has since been amended and from February 1, 1961, the importation of pork and edible pork offal from South America is prohibited.

Meanwhile a nation-wide campaign to eliminate foot and mouth disease commenced in Argentina on January 1, 1961. The plan, as outlined by Snr. Malaccortos, Argentine Agricultural Secretary, provides for obligatory cattle vaccination. Zones for systematic control will then be set up. When the campaign gets under way, cattle will not be permitted to travel from one zone to another without vaccination and certification. The proposed control system is based on the technique used in Britain *i.e.* wherever there is an outbreak of the disease, all movement of cattle will be stopped and it is hoped to confine the outbreak to the particular area. A mobile squad of zone inspectors is to be created, in whom will be invested authority to slaughter suspect animals. It is estimated that the annual cost of eradication will be 8,000 million pesos (approx. £33 million).

Vaccination will commence in cattle breeding areas adjoining the disease-free sheep breeding areas in the South and extend northwards as the scheme progresses. Probably 15 years will have passed before elimination of the disease is complete.

HOME PRODUCTION

"There is still unsatisfied demand for home-produced beef and prospects are good for increased production," stated Mr. J. Godber, Joint Parliamentary Secretary to the Minister of Agriculture recently. "Beef is the most popular meat and normally accounts for approximately one half of the total domestic per capita meat consumption. There is a marked preference for home-killed, and an increasing demand for it, and home-beef production is steadily increasing under the stimulus of guaranteed price and the subsidy payments for calves and hill cows."

The agricultural census for England and Wales indicates the total number of cattle and calves increased during the nine-month period ended September, 1960, whilst those of sheep, lambs and pigs were reduced.

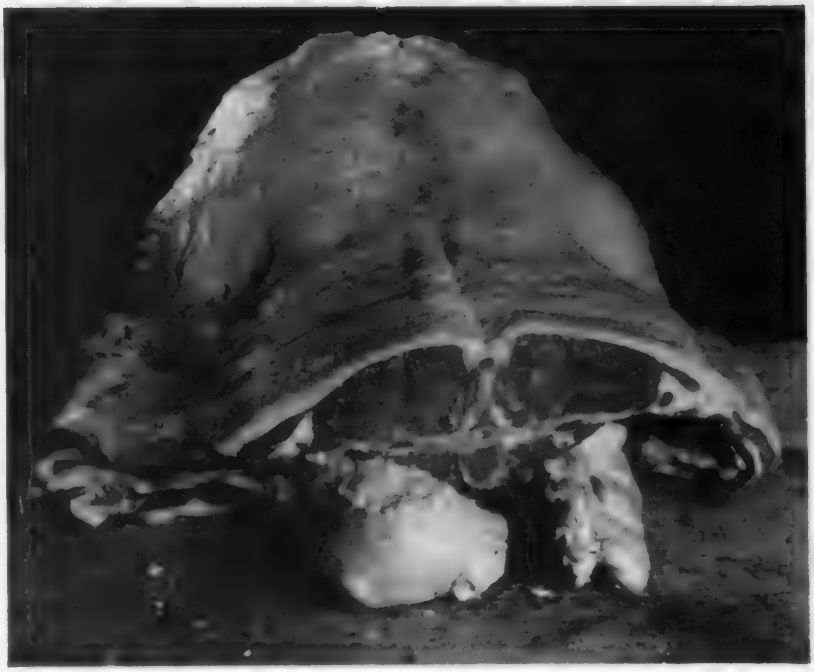
The cattle breeding herd (beef and dairy type cows) is up by 75,000 (2·4%) on last year, but there are 25,000 (4·2%) fewer heifers in calf with first calf.

Breeding ewes increased by 294,000 (4·4%) but shearling ewes fell by 205,000 (12·2%) and there were 97,000 (1·5%) fewer lambs.

The total pig breeding herd (sows and gilts in pig, and other sows for breeding) was 14,000 (2·5%) higher than at June, 1960, and 27,000 (5%) above the corresponding figure for September, 1959. Whilst the total number of pigs is down, the increase in the pig breeding herd encourages the hope that home-produced pork and bacon will soon be in more reasonable supply.

The Pig Industry Development Authority have recommended to the Government that arrangements be made to import Pietrain pigs to Britain for testing. The P.I.D.A. would acquire the pigs, control them during the testing period and provide the testing facilities. The pigs would be tested pure and crossed with some British breeds.

The Pietrain is a Belgian breed of pig, whose origin is obscure and which came to prominence about 1950. It is said to be a hardy breed, and compared with other improved breeds, *e.g.* Landrace, apparently shows a lower fertility and food conversion rate. Tests show that Pietrain pigs provide good commercial carcases when slaughtered at live weight of 90-95 kilo (approx. 200 lb.). In carcase conformation they show exceptionally heavy and well shaped hams and shorter, though thicker, loins than Landrace. Whilst the lean to fat ratio is more favourable in Pietrain, the Landrace shows a more even distribution of back-fat, that for Pietrains being thin over the loin and thick over the shoulders. Certain Pietrain crosses, particularly first crosses, are said to show a heavy deposition of fat over the shoulders and short bodies.



A baron of beef, weighing 125 lb., sent by Rhodesian farmers to Mr. Macmillan. The 28-month three-quarter bred Sussex bullock from which the baron came weighed 1,220 lb. on the hoof, hotweight 733 lb., cold dressed weight 711 lb. (*Photo by courtesy of The Meat Trades Journal.*)

Tuberculosis eradication completed

The successful completion of the Government's plan for the eradication of bovine tuberculosis was announced on October 1, 1960, when the whole of Great Britain became an attested area.

The eradication has been achieved in the short space of ten years. Scotland and Wales attained their objective a year ago. The total cost of eradication is estimated to be in the region of £130 million, the greater part being paid to farmers in the form of bonus.

Hormones in meat production

The D.S.I.R.—Food Investigation Report 1958—makes the point in connection with hormone administration that "there is no significant difference between the composition of beef (except in carcase conformation and finish—treated animals being leaner) from normal steers and from those implanted with hexeostrol at levels which produce desirable effect in weight gains."

Scientists at a recent symposium in Buenos Aires on the effects of hormones on meat production agreed in general that treated cattle yielded 20% more than untreated animals. It was noted that results varied in different countries.

Dr. Alberto Cano, Buenos

Aires University, said that residual hormones found in meat were neglible and often nil. "A person would have to eat 120 lb. of meat daily to suffer any effect."

Research workers from Britain, North and South America, Japan, Mexico and Australia took part in the conference.

Importation of Charollais

The Government recently accepted the recommendations contained in the report of Lord Terrington's Committee, set up to consider the importation of Charollais bulls into Britain.

The Committee are in favour of experimental importations, as they consider this breed may possess desirable characteristics when used for cross-breeding for beef production from dairy herds.

With proper safeguards they do not believe such importations would increase the incidence of disease nor, in their opinion, would export trade in pedigree livestock be adversely affected.

The Committee paid visits to farms in France where the Charollais was being produced and used for cross-breeding. They found the average birth weight of pure breds to be about 100 lb. Characteristic conformation of the Charollais were clearly imparted to the progeny in Friesian crosses. Baby-beef from well-fed Charollais are marketed at about 10 cwt. live at 12 to 15 months of age. The Committee found that Charollais were being used extensively outside France, *e.g.*, South America, U.S.A. and Canada. In the North Americas they had been tried against Herefords and had shown a superior rate of growth in most instances and sometimes a better financial yield. Leanness is a consistently noted feature and tenderness of the meat has been found closely comparable with that from Herefords.

The Committee consider that there is a clean balance of advantage in conducting a trial of Charollais bulls for cross-breeding for dairy cows and heifers in Britain. It is recommended that the bulls should be selected by the Ministry (Agriculture) and remain in Ministry ownership. The trial envisaged would consist of the use of Charollais bulls on dairy cows from commercial herds, where records of the characteristics of the cross-bred cattle would be kept. In addition, a small progeny test of Charollais cross Ayrshire cattle in conjunction with tests on other cross-bred cattle, would provide useful data for the comparison of food conversion rate of the various cross-bred animals.

The Irish Department of Agriculture have also agreed to accept the Committee's recommendation.

Charollais are high on the list of Argentine cattle imports. During the first six months of 1960, 435 pedigree cattle were imported into Argentina, the chief being:

	bulls	*cows*	*total*
Santa Gertrudis *	49	90	139
Charollais	13	97	110
Aberdeen Angus	51	9	60
Polled Hereford	14	29	43
Hereford	13	11	24
Shorthorn	26	—	26

* Santa Gertrudis breed was evolved in U.S.A. from the mating of Brahman bulls crossed Shorthorn cows. Modern Santa Gertrudis cattle are for the most part red in colour, and possess a slightly higher percentage of Shorthorn than Brahman. They are proved to be the heaviest of the beef breeds when raised under similar conditions, and are highly adaptable in countries where conditions are semi-tropical.

"Systemic" drugs for treatment of warble fly

Damage and losses by "warbles" which cause great depreciation in value of cattle hides, besides being responsible for uncountable losses in production of both meat and milk, may be a thing of the past if the new warble-killing drugs prove as successful under general commercial conditions as in preliminary tests. It has been estimated that well over 50% of cattle are affected in varying degrees. Until recently, efforts to exterminate or control this parasite of farm animals have been confined to external Derris dressing of cattle between March and June. (The Warble Fly—Dressing of Cattle Order 1948.) New drugs, which are known as "systemics" (*i.e.* they kill the warble grub before it matures under the skin of the animal's back, and so prevent or drastically reduce loss of condition in the animal and damage to the hide), have recently been introduced.

Dow Agro Chemicals, Ltd., who introduced the systemics to Britain in the autumn of 1959, report the results of their commercial trials. In each of several tests they claim there is a significant reduction in the number of warbles found on treated animals—some being 100% free—and increased live-weight gains are recorded. Independent tests also show encouraging results. The West Riding Agricultural Institute report that 21 Friesian steers were dosed (the drug Etrolene being administered as a drench, dosage 1 fluid oz. per 100 lb. live-weight) and 20 similar beasts, untreated, were used as controls.

When the warble count was made "no warbles were visible on the treated animals, whereas on the control group, as many as 16 warbles were counted on one animal." Average weights of the treated animals were reported as increasing by 230 lb. (2·21 lb. per day), while the untreated group increased 199 lb. (1·9 lb. per day).

The drugs may be administered in pill form with apparently equally encouraging results. It is recommended that only young stock, dry cows and beef cattle be treated. The treating of lactating dairy cows may cause the milk to become tainted. The cost of treatment is said to be between 5s. and 10s. per beast.

(To be concluded)

What our Readers think of FOOD MANUFACTURE

Comments on our readership survey

AS explained in our Editorial Comment on p. 497 of our December, 1960, issue, it is important for us to know what our readers want to read in FOOD MANUFACTURE and whether or not we are giving them what they want. It is also important to know as much as possible about our readers themselves, and so from time to time we send them questionnaires. The most comprehensive survey yet carried out was recently completed and analysed; from it emerges a broad picture of the sort of person who reads FOOD MANUFACTURE, what he wants to read and how far we go towards satisfying his needs.

The response to our questionnaire was very satisfactory and we are warmly grateful to the large number of readers, both at home and overseas, who took the trouble to complete the questionnaire and return it. We are indeed mildly astonished by the high proportion of replies from overseas, and we are gratified and encouraged at the fact that there is hardly a corner of the globe where FOOD MANUFACTURE does not find its way.

The questions were designed to discover the status and interests of the reader and to find out his opinions of the journal. The first point to emerge is that readership is heavily concentrated among senior executives—directors, partners, general managers, production managers, factory managers, chief chemists—who make up approximately 70% of the readers. Naturally, technical and production staff overwhelmingly predominate, but a fair number of readers (13%) are engaged in commercial and administrative pursuits—sales directors and buyers, public relations officers, etc.

The typical reader is engaged in production management or research and his interests are mainly technical. In general he is well satisfied with the presentation of the journal as it is; comments such as "perfectly satisfied with present set-up," "well-balanced as it is," "carry on as you are," "satisfied as it is," occur frequently.

Our regular features are well liked, especially Advances in Food Technology and machinery reviews. Some people even like our editorial comments. The advertisements, too, come in for special mention, many readers finding them useful and helpful.

A number of readers went out of their way to offer valuable constructive criticism; to these we are especially grateful. To all who co-operated in the survey we extend our thanks; wherever possible we shall adopt their suggestions. Before giving an analysis of the survey, here is the pattern of our readership as disclosed by the replies:

	Per cent
Chairmen, principals and senior partners	7
Directors, including managing directors, technical directors, production directors, works directors ...	37
General managers, production managers, factory managers, works managers, asst. works managers, group managers ...	26
Chief chemists, chemists, technologists and analysts	17
Sales directors, chief buyers	4
Librarians, information officers, consultants, public relations officers, miscellaneous and not disclosed ...	9

The questions asked were as follows:

1. What does your company manufacture?

Except in cases where this question obviously did not apply (educational establishments, research organisations, consultants, etc.) everyone answered this question; apart from manufacturers and suppliers of every conceivable food product, replies were received from manufacturers of machinery and capital goods, chemicals, plastics and laminates, packaging materials (including tinplate, foil, can sealing compounds and collapsible tubes) and containers.

2. What position do you hold in your company?

Analysis of the readership has been given above. Almost everyone answered this question; our readers comprise:

Chairmen, partners, directors, managing directors, technical directors, research directors, sales directors.

Managers (unspecified), works managers, production managers, general managers, product development managers, brand managers, advertising managers, technical service managers, assistant managers.

Company secretaries and treasurers.

Chief chemists, chemists, chief analysts, city analysts and public analysts.

Officers-in-charge of Government departments.

Professors and heads of educational departments.

Engineers and chemical engineers, technologists and technical advisers.

Sales executives, regional sales managers, market research executives.

Chief buyers, buying supervisors, purchasing executives.

Librarians, chief technical officers, P.R.O.s, heads of information departments.

Hospital group catering officer.

Editors of technical journals.

3. Is your appointment primarily commercial or technical?

	Per cent
Commercial	24
Technical	53
Both	16
Neither/Not disclosed ...	7

4. How long have you read FOOD MANUFACTURE?

Almost everyone answered this question. The number of readers who started with the first issue over 33 years ago is surprisingly large. The pattern is:

Years	*Per cent*
0 - 5	32
6 -10	32
11-15	16
16-20	7
21-15	6
26-33	7

5. How many persons read your copy of FOOD MANUFACTURE?

Persons	*Per cent*
1 - 3	37
4 - 6	30
7 - 9	7
10 and over ...	21
Not disclosed ...	5

6. What existing articles or features do you like best?

7. What subjects would you like covered more often?

These answers were analysed together. The first point that emerges is that our readers require a high technical standard, with, not surprisingly, emphasis on new developments. Our factory articles are well liked, many saying they like to know what other people are doing. Descriptive articles of new plants, machinery, processes and packaging methods are unanimous wants. Many people request more articles on subjects specific to their interests; some are a little vague, requesting "general information," others want more "particular" and less "general" articles (it is difficult to please all the people all the time!). One noteworthy point is the number of people who want information more useful to the smaller man; one answer to question 7 was: "'Home contrived' plant and not so much of the £3 million giant factories."

One New Zealand manufacturer wrote: "The big U.K. firms use New Zealand to get rid of their out-of-date plant and keep us some 3 years behind."

Many readers expressed satisfaction with the present balance of coverage.

8. In your company do you control or are you consulted on the purchase of: (a) raw materials; (b) machinery; (c) packaging materials; (d) general factory equipment?

The overwhelming majority of readers answered "yes" to these questions. The number of affirmatives in each group was very nearly equal and the pattern of replies was roughly as follows:

	Per cent
Yes	72
No	14
Not disclosed ...	14

Some readers were kind enough to make complimentary remarks. An Australian reader commented that FOOD MANUFACTURE is "one of the most useful and readable of the food magazines." He added that we should give less space to "personal paras. on V.I.P.s" as these "mean nothing to readers in other countries and probably almost nothing to British industry." Some people, on the other hand, liked the personal columns, although of all our features this was perhaps the one mentioned least in replies.

To all our readers go our thanks for co-operating in a valuable survey.

Books Received

Pressurised Packaging

The second edition of this comprehensive book* which first appeared in 1958 brings it fully up to date, new material on compressed gases and formulations employing compressed gases being included. This makes it of greater value to the food manufacturer, although the section devoted specifically to foods comprises a mere 16 pages out of the total of 509.

The book's 21 chapters deal with propellents, containers, valves, filling methods, laboratory procedures, emulsified systems and others. Trade names and patents and a world directory of suppliers are included, and there are many references to papers in the world's scientific and trade journals.

* *Pressurized Packaging (Aerosols).* (2nd Edn.) By A. Herzka and J. Pickthall. Butterworths, London, 1961. Pp. 509. Price 70s. net.

Bakery Technology

A 669-page volume from the U.S.A.* prepared by a group of more than 20 specialists provides those interested in bakery science with a discussion of the scientific principles of modern large-scale processing methods and introduces them to the application of automation in the bakery. To provide a complete treatment, extensive descriptions of the chemistry and technology of the most important raw materials are included, as well as discussions of the fundamental processing techniques which can be applied to doughs and batters. Most of the chapters are accompanied by extensive bibliographies.

The four sections deal in turn with the materials of baking, formulations and procedures, equipment and engineering, and testing the finished product.

* *Bakery Technology and Engineering.* Edited by Samuel A. Matz, PH.D. The AVI Publishing Co., Inc., Wesport, Conn., U.S.A., 1960. Pp. 669. Price $16.00.

CORRESPONDENCE

Bites of caviar and grains of boric acid

SIR,

I have been amazed to read in FOOD MANUFACTURE and other technical journals that F.A.O., Rome, has issued a press handout stating that boric acid is acceptable as a preservative in caviar in all countries except Germany and the U.S.A. Because there have not been a number of headlines in our newspapers describing prosecutions for the illegal presence of various preservatives, including boric acid, in caviar and mock caviar, this does not mean that no action has been taken and that preservatives such as boric acid, hexamine, and parahydroxybenzoic acid are permitted. Numerous instances have come to light, but generally importers are contacted without the necessity of prosecution. Possibly some caviar has been imported into this country containing boric acid and without it being noticed, but one has to remember that caviar is a luxury commodity and that it would be impossible to examine every batch or even brand of preparation that enters the country.

It cannot be stated too clearly that no preservative, other than substances declared not to be preservatives within the meaning of the Regulations, may be added to any fish product. The Report of the Food Standards Committee on Preservatives in Food, paragraph 258, mentions that the Committee received a number of representations from firms in Scandinavia and importers of fish products about a variety of fish products with a specific note of "eel and cod roe, lumpfish roe, and anchovies," showing that these were considered. It is a pity that the Report only mentions the so-called Mock Caviars. The Committee conclude that in their opinion "if these fish products are to be marketed in this country, they should be distributed under refrigerated conditions and not permitted to contain a preservative."

When reading an official handout of this type from an organisation such as F.A.O. one cannot but wonder, Sir, what sort of liaison exists between our own Government Department and F.A.O.

THOMAS MCLACHLAN,
4, Hanway Place,
London, W.1.

Filled milk: an objection

SIR,

As a farmer, with many farmer friends, we read with interest your paragraph headed "Filled milk—what we think," which endorses the Milk Marketing Board's recent "smear" campaign against any competitor. We think, however, in all fairness to the producers of this product, it should be pointed out that: (1) it is *not* an inferior substitute "with questionable nutritive properties" (this is supported by medical opinion); (2) the manufacturers consume a very large quantity of U.K. milk to produce it; (3) many farmers use it themselves as an economic proposition to enable them to send more of their own milk to the Board; and last but not least (4) the use of it reduces the competition from *imported* whole milk, to which you refer, and which normally competes with the British farmers' liquid product.

W. G. WEST,
"Sandyhurst,"
Sandy Lane,
Northwood, Middx.

▶ *Saromex Spices* form the subject of a booklet giving full information on the production and qualities of spices made by Stafford Allen and Sons, Ltd.

Radioactivity and Food

A publication* from F.A.O. contains a summary of the conclusions and recommendations of an expert committee of F.A.O. on "Radioactive Materials in Food and Agriculture." More detailed information and conclusions are to be found in five technical appendices.

The committee was set up in response to a recommendation of the Tenth Section of the European Commission on Agriculture and to a resolution of the United Nations Scientific Committee on the Effects of Atomic Radiation to review present knowledge, to indicate possible improvements in surveys of radioactive substances in foods, and to make suggestions regarding further research.

The committee considered the problems of radioactive contamination of the food chain with particular emphasis on soil and plant contamination, although animal products, marine biology, human diet and survey and sampling problems were considered.

* *Radioactive Materials in Food and Agriculture.* (F.A.O. Atomic Energy Series No. 2.) H.M.S.O., 1961. Pp. 103. Price 7s. 6d. net.

National College Open Day

As part of the celebrations of Commonwealth Technical Training week, the National College of Food Technology, Weybridge, Surrey, is holding an Open Day on Wednesday, May 31, and members of the food industry are cordially invited between the hours of 10.00 to 12.00 and 14.00 to 17.00.

Contributions and Correspondence

The Editor welcomes practical contributions on all aspects of food manufacture, including the production and testing of raw materials. Articles should be illustrated with photographs and diagrams, as far as possible.

Letters on any subjects covered by *Food Manufacture* are also invited.

Manufacturers and the Law

What can be Patented?

By Lord Meston

To most scientists and engineers the workings of the Patent Office must often seem abstruse and complicated. Industry, one is informed, could not survive but for the safeguards afforded by a valid patent. Yet, how many people really know what can be patented? To understand that fully a legally valid definition of a process and method of invention must be given; this is not always coincident with the accepted definition. This article explains the legal requirements of taking out a patent and especially what constitutes a method of manufacture.

IN other words, what can be the subject matter of a patent? The answer is that this must be an invention, which is defined in the Patents Act, 1949, as "any manner of new manufacture the subject of letters patent and grant of privilege within Section 6 of the Statute of Monopolies, and any new method or process of testing applicable to the improvement or control of manufacture, and includes an alleged invention."

By long usage "manner of manufacture" has come to include not only articles and substances produced by manufacture, but also manufacturing processes. Machinery and factory equipment generally are included, as themselves manufactured things.

"Manufacture" connotes first of all the making of something. It is seldom that there can be a process of manufacture unless there is a "vendible product" of the process, something useful for its own sake and vendible as such.

What is meant by a "vendible product?" This term is not to be found by any Act of Parliament but has become part of the law and practice of patents. At first sight, the word "vendible" refers in some way to a sale or the capacity for being sold. But that is not really the dominant meaning of the term in the present sense. "Vendible product" in reference to the result of manufacture lays emphasis upon the trading or industrial character of the process. A manner of manufacture in its ordinary sense imparts the idea of making "something"; and by "something" is commonly understood something tangible and material. Therefore, the term "vendible product" does not cover something which is academic and intangible as, for example, a method of diagnosing a disease.

Methods and processes

Methods and processes are in a different category from articles and apparatus. An article or apparatus is *prima facie* a manufacture, but a method or process is not a manufacture unless it results in the production of some tangible vendible product. There are many ingenious methods or processes which result in no vendible product and are accordingly incapable of protection by patent. One might instance methods of diagnosing or treating diseases, methods of chemical or physical testing, methods of detecting hostile aircraft, and so forth. Likewise a method of extinguishing incendiary bombs falls within the category of methods which are inherently incapable of protection by patent. If a person puts out an incendiary bomb, whether by means of sand, water, zinc chloride solution, or any other means, he is performing his civic duty, but certainly not conducting any manufacture.

A method or process is a manner of manufacturing if it (*a*) results in the production of some vendible product, (*b*) improves or restores to its former condition a vendible product or (*c*) has the effect of preserving from deterioration some vendible product to which it is applied.

The general meaning of the term "product" is capable of considerable extension. Thus a patent has been granted for a method of protecting subsoil against subterranean fires—protected soil being regarded in some sense as a "product." Furthermore, the term "product" here may include things that are not "articles" and things that are evanescent. Thus patents may be granted on the basis that electricity is a "vendible product."

Methods of working sources of power other than electric generators are patentable. For example, methods of working internal combustion engines may constitute valid claims for patents. The general practice of the Patent Office is to accept claims for new methods of working any apparatus that would itself, if new, be patentable, provided the novelty in the method is substantial and is mechanical in character.

Discovery and invention

A mere discovery is not the proper subject matter for a patent. The distinction between a discovery and an invention is that discovery adds to the amount of human knowledge, but it does so only by disclosing something, while invention also adds to human knowledge, but not merely by disclosing something. Invention necessarily involves also the suggestion of an act to be done, and it must be an act which results in a new product, or a new result, or a new process, or a new combination for producing an old product or an old result.

Information

Mere information is not a "product" in the sense we are discussing. Nor is every process that produces something vendible an invention. Manufacture connotes the sort of thing that is done in a factory and not, for instance, agricultural or horticultural operations. Therefore, a claim for a patent has been refused in connection with pruning and protecting the raw surfaces of clove trees with good sterilising dressing to prevent the entry of fungi. The ground of the refusal was that a fruit tree is not a product in the present sense. New strains of living creatures, animal or vegetable, are not patentable, nor are ways of producing them. On the other hand, microbiological methods of manufacturing chemical substances are as patentable as any other manufacturing methods.

A few practical examples may be useful. Patents have been refused for the use of a known substance as a fertiliser, as a weedkiller and as an insecticide, and also for a method of fumigating buildings by spraying with a known substance.

On the other hand, patents are habitually granted for methods of permanent waving. Some patents have been granted for improvements in the manufacture of substances such as penicillin, the improvement lying only in the technique of growing the living organism concerned. A patent has been granted for a method of manufacturing chemicals by fermentation, the only novelty lying in the way of selecting the bacteria for the fermentation and in the resulting higher yields.

"Alleged invention"

As to there being an "alleged invention," the position is as follows: To be an "invention" there must be not only a manner of manufacture or method of testing, but one that is new or is alleged to be new. That is to say, there must be novelty alleged which is mechanical in character, which is possessed by the article or process in its capacity of a manufacture.

Therefore, a patent can be refused where the only material product is a printed sheet, tickets, coupon or its equivalent, and the only alleged invention an arrangement of words or the like upon such sheet, the new arrangement serving no mechanical purpose.

A patent will not be granted for a "mere scheme or plan" as distinct from a new arrangement of apparatus for putting the scheme into effect. On this ground, the following have been held to be unpatentable—a new system for arranging houses in a row; the colouring of fertilisers to aid in distinguishing them; systems of naval tactics or military camouflage.

It is not an "invention" merely to make an article from a substance that is known to be suitable for making it but which happens never to have been used for it before.

New use of an old thing

There is a general rule to the effect that a patent cannot be granted for a "mere new use of an old thing." But the strict application of that rule has been sometimes relaxed. For example, patents have been granted in respect of a motor-car windscreen made of toughened glass, and a copper container for a known process used under conditions where its behaviour could not be predicted and resulting in improvement in working.

If the subject matter of a claim for a patent must inevitably be too wide it is not patentable. The ordinary example of this type of case is a claim to any method of performing a known manufacturing operation automatically.

Manner of manufacture

As we have noted, an invention to be patentable must include some "manner of manufacture." It is within the province of the Comptroller of Patents to decide whether the subject of an application for a patent is a "manner of manufacture," so that it is unlikely that any invention which did not satisfy this requirement would ever become the subject of a granted patent. There is in fact no reported case in which a patent has been held invalid merely on the grounds that the invention claimed was not a manner of manufacture. Therefore, in an action for infringement of a patent it is extremely unlikely that the defendant can raise by way of defence that the plaintiff's invention is not patentable because it does not involve a manner of manufacture. That very point was decided by the Comptroller of Patents when the plaintiff or his predecessor in title made the application for the patent to be granted to him in the first instance.

Novelty

However, different considerations apply when we consider the question of "novelty." In an action for an infringement of a patent, the defendant may raise, by way of defence, a plea that "the invention is not new having regard to what was known or used in the United Kingdom." In other words, has there been some "prior use" of the alleged invention before the plaintiff obtained the grant of a patent for that invention? A celebrated case on this point was the Gillette Safety Razor Co. *v.* the Anglo-American Trading Co. Ltd. A patent had been granted for "Improvements in or relating to safety and other razors." In an action for infringement of the patent the defendants denied infringement and alleged that the patent was invalid for want of novelty and of subject matter. The subject matter of the patent was "a safety razor comprising a thin flexible blade detachably combined with a holder by which the blade is positioned and supported and its cutting edge is given the rigidity necessary to make it operative for shaving."

The evidence showed that a similar device had been in use before the patent in question was granted to the plaintiff. The result was that the defendants were not liable.

ADVANCES in FOOD TECHNOLOGY

ANALYSIS

Detection of antibiotics in meat products

Research has been carried out at the German Federal Meat Research Institute, Kulmbach, to ascertain the most suitable routine method of detecting antibiotics in meat products. The samples consisted of canned meat products to which increasing amounts of the antibiotic (aureomycin, penicillin or streptomycin) had been added. Activity was determined immediately after preparation, after 7-day incubation at 37°C., and after three months' storage of the canned goods at +15–20°C. The "frozen-block method," using Bac. subtilis as test strain as described by Gartside, was found to be a simple and reliable method for the detection of certain antibiotics. The agar hole test, with Bac. cereus or Bac. subtilis as test strain, is recommended for the examination of meat juices, jellies and other liquid components. The TTC reduction method is very sensitive, but rather too laborious as a routine test. In principle, the examination for antibiotics should be carried out on non-incubated canned foods since incubation results in a considerable loss in activity with certain antibiotics, especially aureomycin. The residual activity depends largely on the type and quantity of the antibiotic, on the degree and duration of heating, and on the storage period.—Coretti, K. *Die Fleischwirtschaft*, 1961, **13**, 119.

Detection and estimation of fungal amylase

A simple method is described for the detection and semi-quantitative estimation of fungal α-amylase activity of wheat flour. It depends on the selective inactivation of cereal amylases on bentonite in presence of sodium acetate and detection of the fungal amylase by a cup-plate technique with a starch-agar substrate.—Hayden, *J. Sci. Food Agric.*, 1961, **12**, 123.

Gas chromatographic method for processed foods

A gas chromatographic method is used for the analysis of carbon dioxide, hydrogen, oxygen and nitrogen in head space of processed foods. A silica gel-molecular sieve (Linde 13 X) column was used with either argon or helium as a carrier gas. Swelling of canned whole apricots was found to be due to an accumulation of hydrogen in the head space. Gas formation in stored tomato serum concentrate was found to be due to an accumulation of carbon dioxide formed by the Maillard-type of browning reaction. Data on the analysis of oxygen in nitrogen-packed salad dressing, salad oil, and instant mashed potatoes are reported.—Luh and Chaudhry, *Food Technology*, 1961, **15**, 52.

BREWING

Management of fermentation

In brewing, the most difficult phase to regulate is fermentation. Yeast, a very complex and sensitive organism, occurs in the form of numerous strains that possess different characteristics with respect to rate of fermentation and growth, flocculence and production of aromatic substances. These characteristics, in turn, are rather unstable for reasons that are only partly understood.

Further scientific research will be needed before fermentation can be controlled more accurately. Such research, however, is both complicated and time consuming.

In the meantime some pure yeast strains should be obtained whose characteristics and behaviour in the brewery are known so that a change in yeast strain can be introduced whenever necessary. The best method for maintaining these strains in good condition is to inoculate them frequently in liquid wort.

Fermentation should be so managed that it will insure proper yeast regeneration. This is best attained by adequate wort aeration, a low pitching rate and the addition of fresh wort after start of fermentation.

Appropriate temperature control may be applied to regulate the speed of fermentation and to promote the settling of yeast at the end of fermentation. However, this should not be adopted as normal procedure but should be used only as a temporary remedy.

Finally, with regard to modified fermentation systems, such as the Nathan or continuous systems, these are not without their limitations. Thus, for instance, continuous fermentation requires a relatively constant level of sales, and its ability to produce all types of beer still remains to be demonstrated.—J. De Clerck, *The Brewers' Digest*, 1961, **36**, 48.

CEREALS

Measurement of flour whiteness

The whiteness of wheat flour was determined by means of photoelectric tristimulus measurements and substitution of the reflectance values, A, B, and G in a newly derived equation for whiteness. This formula, which is in its most simple form $W = G - A + B$, simplifies the calculation of whiteness considerably, and, therefore, should be considered as useful for routine application. The results obtained were in complete accord with the visually estimated orders as found by means of the Pekar test. They can be considered as representative for visual judgments in average daylight.—Croes, *Cereal Chemistry*, 1961, **38**, 8.

Measurement of flour particle size distribution

The particle size distribution of flour, measured microscopically by gravitational sedimentation, centrifugal sedimentation, and sieving, all gave mean diameters and distribution curves which agreed with one another within experimental error. Measurements using changes in electrolytic resistivity gave particle size distribution that deviated significantly and nonrandomly from the other methods. — Irani and Fong, *Cereal Chemistry*, 1961, **38**, 67.

Vitamin distribution in commercial mill products

Nine vitamins were determined in a commercial wheat blend (50% hard red spring and 50% hard red winter) and in the products resulting from its milling. Thiamine was assayed chemically. Riboflavin, niacin, pantothenic acid, folic acid, biotin, *p*-aminobenzoic acid, choline, and inositol were determined by microbiological methods. Choline was found not to be concentrated to any extent in any one product. The other vitamins followed, in general, the well-known distribution pattern of the enrichment vitamins (thiamine, riboflavin, and niacin), with the greatest proportion (50 to 90%) contained in bran and shorts. Comparison of vitamin content of patent flour, first-clear flour, and low-grade flour shows pronounced and progressive increases in all vitamins except choline with decreasing grades of flour.—W. K. Calhoun *et al.*, *Cereal Chemistry*, 1960, **37**, 755.

CURING

Nitrate and nitrite metabolism in brine

The effects of salt, concentration, temperature and bacterial population density on the rates of metabolism of nitrate and nitrite have been investigated in a bacon-curing brine initially

devoid of both. Increasing salt concentration and decreasing temperature diminish the rates of metabolism. The rates could not be related satisfactorily to either total microscope or viable counts of bacteria, but a relationship with total counts seems more probable. —Eddy and Kitchell, *J. Sci. Food Agric.*, 1961, **12**, 146.

FREEZING

Bound water in meat

The German Federal Research Institute for Food Preservation, Karlsruhe, has carried out calorimetric investigations on beef with different water content at temperatures between −180 and 0°C. It was found that the specific heat of beef, as a function of temperature, shows certain irregularities which depend on the water content of the beef. These irregularities can be explained by assuming that an equilibrium, depending on the temperature, exists between bound and free water. The specific equilibrium constants can be determined from measured sorption isotherms. In spite of the relatively good agreement between the calculated and experimentally determined values of specific heat, the findings should, for the time being, still be regarded as a working theory only, until their validity has been corroborated by further experimental and theoretical investigations. L. Riedel, *Kältetechnik*, 1961, **13**, 122.

Freezer burn in muscle tissue

While meat unprotected by connective and adipose tissues is rapidly frozen, freezer burn appears at relatively small weight loss during storage. When economical considerations exclude the application of moisture-proof packaging, the onset of freezer burn can be shifted to the range of high weight losses by slow freezing and, more effectively, by treatment of the surface of the meat, *e.g.*, with higher alcohols. Such high weight losses have to be avoided in any case to maintain the initial bloom.—G. Kaess, *Kältetechnik*, 1961, **13**, 89.

Effect of freezing and thawing on ascorbic acid content

Destruction of ascorbic acid occurs during freezing and thawing of frozen peas, lima beans, corn and green beans. A study of 176 samples indicated that the thawing time may be as important as thawing temperature. The most significant factor in ascorbic acid loss when vegetables are alternately frozen and thawed is the time and temperature of holding during the thawed phase.

Vegetables may be held from 4 to 8 hours after blanching and before freezing without an appreciable loss in ascorbic acid.—Hucker and Clarke, *Food Technology*, 1961, **15**, 50.

FRYING

Effect of method of care on frying life of fat

The effect of four methods of care on the frying life of a hydrogenated vegetable fat processed for food service deep fat frying was investigated. The methods were I—filtered, stored in a covered metal container at 2° to 5°C., and 20% (of original weight) fresh fat added each 8-hr. frying period; II—filtered, stored in a cleaned fryer at 20° to 25°C., and 20% fresh fat added each frying period; III—filtered, stored in a cleaned fryer at 20° to 25°C. and fresh fat added to replace that lost during each 8-hr. frying period; IV—skimmed, stored in fryer at 2° to 25°C., and fresh fat added to replace that lost at each frying period. Frying life of the fat was determined by palatability scores for French fried potatoes. Fat cared for by methods I and II had a frying life of more than twice that of fat cared for by methods III and IV. Methods I and II also required approximately twice as much fat as methods III and IV to fry 100 g. of potatoes, which would affect the cost of a serving of French fried potatoes. The cost of a 100% fat turnover that would be required more than twice as often for methods III and IV than for methods I and II should be considered. Filtering and refrigerating the fat and cleaning the fryer between frying periods also prolonged the frying life of the fat.—Rust and Harrison, *Food Technology*, 1960, **14**, 605.

FUMIGATION

Control of Ascochyta blight of peas

Ethylene oxide, methyl bromide, mercury and organo-mercury compounds were ineffective as fumigants for the purpose. Chloropicrin proved more satisfactory, fumigation at saturation concentrations killing the three pathogens, when diseased Zelka seed with a moisture content of 16% was exposed for 72 hr. at 20°. This unusually long treatment was necessitated by slowness in penetration. Zelka showed little fumigation damage in the laboratory or in the field. A "Blue" variety showed little damage in field trials, in which the emergence of Feltham Advance was reduced by 29%. All seeds were so heavily infected that some interaction between fungal and fumigation damage was anticipated. A commercial sample of the variety "Onward" was very susceptible to chloropicrin. In all experiments the vigour of plants grown from fumigated seeds was normal. Cultures of the pathogens were killed by dilute aqueous solutions of chloropicrin, the responses of the three species being markedly different.—Kennedy, *J. Sci. Food Agric.*, 1961, **12**, 96.

PASTA

Measurement of torsional strength of macaroni

A device is described for measuring the torsional strength of macaroni and spaghetti. The standard error of the means of ten measurements was 1·79 kg. per cm. A highly significant correlation of +0·85 was found between torsional strength and bending strength of 25 samples of macaroni, but neither of these properties was significantly correlated with the "wet weight" of the macaroni after cooking. However, the smaller the value of the torsional or the bending strength, the more observable were such defects as inelasticity, splitting, checking, or tendency to become sticky upon cooking. This device is particularly useful for detection of hidden failures in macaroni. In a macaroni specimen a fissure running in a straight line along the axis of the cylinder, or very fine irregular cracks or checks, can exist. Such a macaroni may show a rather high bending strength but when twisted, just as during cooking, it disintegrates.—Karacsonyi and Borsos, *Cereal Chemistry*, 1961, **38**, 16.

RADIATION PRESERVATION

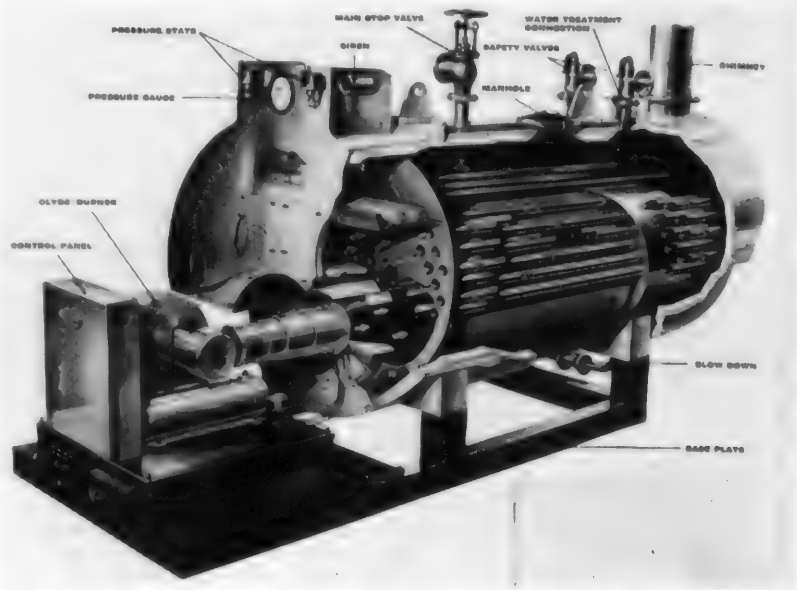
Resistance of natural bacterial flora of cured ham

Three separate experiments were conducted to study the radiation resistance of the natural bacterial flora of canned ham. Most strains were extremely sensitive to irradiation and were destroyed at low levels. Two strains of cocci were able to survive high levels of radiation but were not studied extensively since in commercial processing they would be destroyed with low levels of heat. Small numbers of spores were able to survive high levels of radiation in cans of cured ham. These spores were identified as the S-2 strain of PA 3679. If curing salts (salts, sugar, nitrate and nitrite) were present in normal amounts the ground ham did not spoil in the cans given at least 0·5 megarad irradiation when incubated at 26°C. and 30°C. for a period of two months. The spores were able to grow and produce spoilage through a radiation level of one megarad, providing no curing salts were present in the meat. Counts after incubation indicated that the cells were increasing in numbers in cans of meat containing no curing salts. No marked differences were found in destruction of bacteria between a gamma source and electron beam source of irradiation.—W. L. Brown *et al.*, *Food Technology*, 1960, **14**, 622.

MACHINERY and EQUIPMENT

PACKAGE BOILER

Manufactured by John Thompson (Wilson Boilers), Ltd., the *Demipac* has been introduced to meet the requirements of the smaller steam user seeking a fully automatic boiler capable of utilising heavy fuel oil, at a low capital cost. Covering a range of 500-2,000 lb. per hr. evaporation, the *Demipac* embodies a three-pass design with a wet back combustion chamber. The pressure jet air blast atomising type burner is designed to operate on 950 secs. Redwood No. I oil. The *Demipac* is also suitable for adaptation as a coal-fired unit.



The "Demipac" package boiler made by John Thompson, Ltd., is intended for the smaller steam user and covers a range of 500 to 2,000 lb./hr. of steam.

TEXTURE METER

An instrument to determine the state of maturity for peas, corn, limas, *etc.*, for canning or freezing purposes, has been perfected by W. J. Hart and Sons (London), Ltd. Simple, compact and light, it adapts itself for use in the cannery and can also be taken into the fields to make mechanical tests informing the grower of the proper time to harvest the crop.

VACUUM/PRESSURE PUMP

Operated by an electromagnetic vibrator from an a.c. supply the *Reciprotor* combined vacuum/pressure pump supplied by Edwards High Vacuum, Ltd., is available in two versions. Type 406G is designed for continuous operation and provides free air displacement of 1·62 cu. ft. per min., having a pressure of 7·8 lb. per sq. in. Type 606G is rated for intermittent operation and delivers air at 1·77 cu. ft. per min., having a pressure of 10·7 lb. per sq. in. Manufactured in Denmark, the machine is compact, weighs only 10 lb. and gives oil-free air delivery, as no lubrication is necessary.

TELESCOPIC ELEVATOR TRUCK

A mobile telescopic elevator in the *Vertolifter* range has recently been introduced to meet the demand for high stacking of light loads at fast speeds. Two standard heights of lift are available, 120 in. or 148 in. and loads up to 350 lb. can be elevated at a speed of 26 ft. per min. Twin forks are 24 in. long and a detachable platform can be fitted if required. Lowered heights are only 74½ in. or 88½ in. respectively, so that the elevator can negotiate standard doorways. The hydraulic ram is powered by battery or by single or three phase mains electricity. A hand operated variable speed release valve permits safe controlled lowering. The working parts are shrouded by a removable one-piece, sheet steel cover.

ALUMINIUM ICE-CREAM CANS

Cans made from 22 SWG aluminium alloy to BA 60 (1·2% manganese) ¾ hard temper, having a capacity of four gallons, are being used for packaging and storage at the Acton factory of T. Wall and Sons (Ice-Cream), Ltd., which can store 150,000 cans. The use of aluminium is dictated by its freedom from rusting, its resistance to chemical attack by foodstuffs materials and its physical properties of light weight and high thermal conductivity. The cans are of conventional construction, being formed with a single disc seam and a rolled-over top edge, the bottom being seamed on in the usual manner.

The "Reciprotor" vacuum / pressure pump supplied by Edwards High Vacuum, Ltd.

AUTOMATIC DISHWASHING MACHINE

Features such as automatic timing, built-in wash tank heating, safety cut-outs, *etc.*, are incorporated in the *New Minor* machine, made by Dawson Bros., Ltd., for the small scale caterer or canteen. Made from stainless steel for easy cleaning, it will wash 1,250 pieces of crockery and cutlery per hr. A rack of tableware is inserted in the machine, the counter-balanced doors closed and the control switch turned on. For 45 secs. the tableware is subjected to a powerful jetted detergent washing treatment at 145°F. delivered by a re-

These 4-gal. aluminium cans are now being used for ice cream packaging and storage at Wall's Acton factory.

volving arm positioned below the rack, followed by a 15 sec. scalding rinse. The rack is ejected on to the table at the exit side by the next rack of soiled tableware as it is pushed into the machine.

SUMP PUMP

Type D pumps, manufactured by Worthington-Simpson, have been applied to sump duties, covering capacities up to 330 g.p.m. and will handle a variety of acids, alkalis and slurries. Certain pumps deal with liquids containing solids up to ½ in. diameter and viscous as well as clear liquids. The newly developed units, intended for use in sumps up to 10 ft. deep, comprise a 10 h.p. motor, mounted on a stool holding the main thrust bearing, a sole plate, suspension pipe, shafting and a pump end. The fixture of the delivery pipe through the sole plate is claimed to facilitate installation, prevents strain on pump delivery and presents a neat arrangement.

POWER-OPERATED RAMP

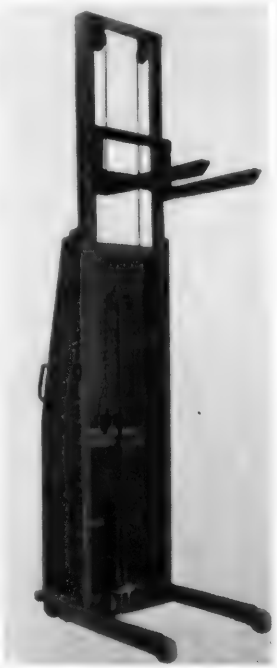
A power-operated ramp, constructed of welded steel angle with sheet metal or wooden platform, which is suitable for elevating trucks and trolleys from the factory floor to lorry height without the use of a loading bay, has been introduced recently. Traction power is provided by a heavy duty girder pattern chain running through the centre channel and driven by a 2 h.p. geared motor. In operation, a truck with drop bolt attachment is brought to the foot of the ramp, the bolt released into the chain and the truck pulled up the ramp, automatically disengaging as it reaches a horizontal platform at the top. Goods of 10 cwt. per truck load can, it is claimed, be trucked directly into a lorry from the factory floor. Details on application.

PALLETS FOR CASKS AND DRUMS

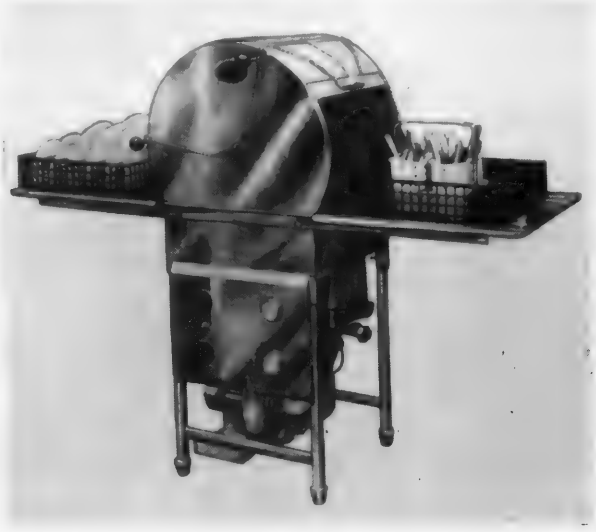
Casks have hitherto been difficult to handle in pallets for use with fork-lift trucks, because of their different capacities and the fact that their dimensions alter after repairs have been carried out. Whitbreads are now using a new type of pallet specially designed for cask handling. Two sizes of pallet are now in use, the firkin (9 gal.) which also takes the 10 gal. metal keg now being more widely used, and the kil (18 gal.). Each cask has its own individual 4-point suspension so that no movement can take place, and rubber tips protect both the containers and the vehicle floor. It is claimed that pallets can be transported four high on vehicles, and stacked eight high in stores.

POTATO REFLECTOMETER

As a result of collaboration with the Low Temperature Research Station at Cambridge, where investigation is being undertaken into the control of browning in potatoes, a potato reflectometer has been developed which will photo-electrically assess browning in potatoes. This potato reflectometer has been designed to avoid the disadvantages and variations in results obtained by visual comparison. Some interesting phenomena have already been observed, among them the relation of browning to variety of seed, soil conditions and other factors.



A new mobile telescopic elevator in the "Vertolifter" range.



Dawson Bros.' latest is this "New Minor" dishwashing machine for canteen or caterer.

PACKAGING

Metal Box Co. Ltd. have made (*right*) these oblong aluminium foil dishes, having the advantage that the contents can be heated in them before eating, and (*left*) confectionery tins for Bristow's of Devon.

New confectionery tin

The *Autocap* tin, made by the Metal Box Co., has been adopted by Bristow's of Devon for their range of nine ½-lb. tins of specialised confectionery. The tins are also suitable for dry foods, powders and granules.

The tins have a slip lid over a heat-sealed paper diaphragm and are filled through the full aperture of the base, the end being seamed on after filling. The lid is tack-sealed to the body by means of the adhesive used to secure the diaphragm.

Autocap tins are offered in a standard range of diameters, at present between 2 1/8 inches and 3 7/16 inches, with several heights available in each.

Paper sacks for storage

Specially sealed multiwall paper sacks claimed to protect stored grain and food from infestation by most insects have been introduced by Reed Medway Sacks, Ltd., in conjunction with Cross Paperware, Ltd. The sacks are sealed with a specially treated tape claimed to give protection for at least 12 months. The new sacks are stitched and closed with *Pybuthrin*-treated thread and tape respectively, which are suitable for existing sack sealing machinery. The makers say that tests were extremely successful, when a number of treated bags stored and examined after 11 months, were found to be intact and unaffected by infestation.

Thread and tape treated with *Pybuthrin* (trade name applied to a mixture of pyrethrins and piperonyl butoxide) were found to possess powerful "knock down" and kill properties not normally found in insecticides containing pyrethrins alone.

Pybuthrin is harmless to man and animals, and is recommended by the Ministry of Agriculture, Fisheries and Food (Infestation Control Division) for the control of insect pests of stored products.

Fibre strapping tape

A new strapping has been introduced under the trade name of *Tufstrap*. It is available in two widths, ½ and ¾ in., with other widths up to one inch to follow shortly. It has no rust danger and is easy to cut, safe to handle and can be burnt, thus speeding up unloading and stacking operations, say the manufacturers.

The strapping has been tested and examined under extreme conditions and although results showed a reduction in tensile strength there was no loss of tension in the bands, which remained in a good reliable condition.

In comparison with steel strapping, it was found to have slightly lower tensile strength properties, but a much higher extension percentage.

New tensioning tools have been designed, a special feature of these being the tensioning unit, a ratchet operated split shaft, which permits maximum tension without the possibility of scuffing damage. The operation of the sealing jaws also activates the cutter blade which is spring loaded for return action after the strapping operation is completed. Tools and a dispenser can be rented from the suppliers. Details on application.

Foil for cake wrapping

Latest to utilise foil for cake wrapping are J. Lyons and Co., Ltd., with a three colour printed wrap adopted for their new Sultana Cake.

The wrap supplied by Venesta Foils, Ltd., is thin (0·009 mm.) aluminium foil backed with a coated 30-g. paper. The foil is aniline-printed on its bright side in red, white and gold, with the opaque white occasionally combined with the transparent red to give a four-colour effect. It is overlacquered with a special coating serving three purposes; to protect the printed foil surface from abrasion; to allow a foil-to-paper heat seal along the wrap seam; and to allow a foil-to-foil seal on the folded ends of the wrap.

Aluminium foil's dual merits of moisture-retaining protection and brilliant sales appeal have been utilised by J. Lyons and Co. Ltd., with a three colour printed wrap supplied by Venesta Foils Ltd., adopted for their new Sultana Cake.

NEWS DIGEST

A.F.D. plant at Greenford

J. Lyons and Co., Ltd., have installed the only accelerated freeze drying production plant in this country at their factory at Greenford. They have bought the Atlas plant which was previously installed at the Aberdeen Experimental Factory.

Changes of address

Head office of Craigmillar and British Creameries, Ltd., has been moved to Bridgewater House, 5-13, Great Suffolk Street, London, S.E.1.

The registered office of Beecham Group, Ltd., and all subsidiaries is now located at Beecham House. The Transfer office is at 6, Greencote Place, London, S.W.1. (Telephone: TATe Gallery 4321.)

The southern regional office of the Pig Industry Development Authority has moved to 15a, Cross Street, Basingstoke. The telephone number, Basingstoke 2047, is unchanged.

Mineral Water Engineers' Association

The Mineral Water Engineers' Association has held its 66th annual general meeting in London, at which the retiring officers and executive committee were re-elected. They are: Chairman: Mr. Leslie Clarke, M.B.E., A.F.C. (Bratby and Hinchliffe, Ltd.); Vice-Chairman: Mr. A. J. Meadowcroft (W. Meadowcroft and Son, Ltd.); Members of the Executive Committee: Messrs. D. Dawson, T. P. Hill, R. W. A. Mackett, G. Staniland, R. C. Webster; Hon. Treasurer: Mr. J. S. Clayton Marshall (George S. Clayton, Ltd.); Hon. Auditor: Dr. E. H. T. Hoblyn, M.B.E. (Director, M.W.E.A.).

The President of the Association is Mr. A. P. L. Blaxter, of Barnett and Foster, Ltd.

Luwa British subsidiary

Luwa (UK), Ltd., a British subsidiary of Luwa A.G., of Switzerland, have commenced business at Reliance House, 340, Clapham Road, London, S.W.9 (Telephone: MACaulay 7776), as suppliers of plant in the U.K.

Labelling of wines regulations

Regulations making a further amendment to the Labelling of Food Order, 1953, as it relates to wines, have come into operation in England and Wales. At present the labels of all wines have to state the fruit basis and alcoholic content, except those obtained by the fermentation in the district of origin of the juice of the freshly gathered grapes. The amending regulations extend the exemption to all wines obtained by the fermentation of the juice of the grapes, provided that they have not been subject to any process so as to alter their character.

Apple juice research

Research into the likely popular appeal of apple juices and apple-blended juices will be started by the Horticultural Marketing Council, the aim being to establish the scope of the market for juice from outgraded home-grown fruit. Blends will be clear apple, opalescent apple, apple and raspberry, apple and orange, apple and apricot and apple and pineapple.

British Sidac's selling agents in Ireland

British Sidac, Ltd., the manufacturers and converters of *Sidac* transparent cellulose firm, have appointed Bishop Plastics, Ltd., Barrow Street, Dublin, as their selling agents in the Republic of Ireland.

Bishop Plastics, Ltd., are an associated company of E.S. and A. Robinson (Holdings), Ltd., and are converters of cellulose film and polythene.

The effect of this agreement will be that the benefit of the combined resources of the two companies will be available to customers in the Republic of Ireland.

Authorised Officers (Meat Inspection) Regulations

Two qualifications have been added to the Authorised Officers (Meat Inspection) Regulations, 1960: the Certificate in Meat Inspection issued by the Royal Sanitary Association of Scotland, and the Certificate for Meat Detention Officers in Northern Ireland issued by the Royal College of Veterinary Surgeons.

Emulsifiers and stabilisers

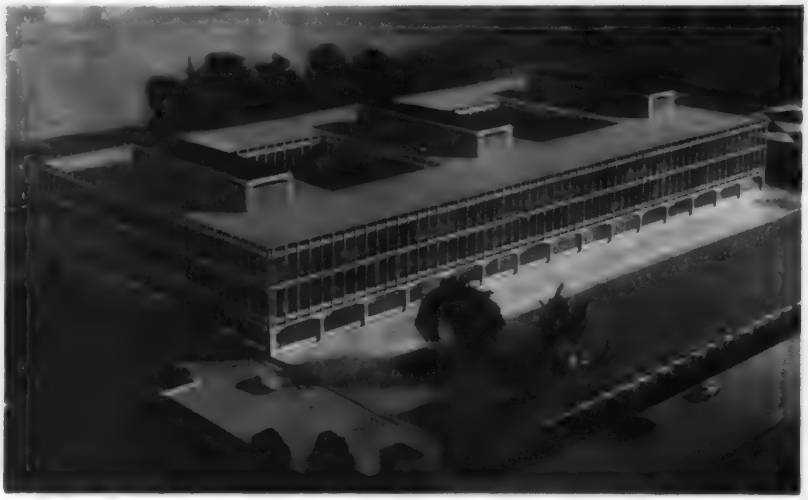
The Minister of Agriculture, Fisheries and Food, with the Secretary of State for Scotland and the Minister of Health, propose to make regulations regarding emulsifiers and stabilisers. Persons who are specifically interested should apply to the Ministry, Great Westminster House, Horseferry Road, London, S.W.1, for a copy of the proposals, reference FS 1290.

Plans to honour Sir Gowland Hopkins

A plaque will be unveiled in June in the Van den Berghs building in London to mark the centenary of the birth of Sir Frederick Gowland Hopkins, who discovered vitamins.

Meredith and Drew profits

The net profit for the year ended December 31, 1961, for Meredith and Drew, Ltd., is £211,832.



A model of the proposed new Birds Eye head office building which is to be built at Walton-on-Thames.

COAL—properly used—is the cheapest fuel for the Food industry

Coking stokers feed coal continuously, quietly and invisibly into this modern boiler.

Over the past few years a minor revolution has taken place in the eating habits of the British public. Housewives have learned that manufactured and processed foods have many special virtues—not the least of which is absolute cleanness—that simplify her daily task of feeding the family. In addition they give her an infinite variety of good and appetising meals regardless of season. But this tremendous expansion of the food market has brought its own problems to the industry. Increasing competition within this market means that every possible economy must be practised if profits are to be increased, and markets expanded.

ECONOMY BEGINS IN THE BOILERHOUSE

There are still many managements that handicap their finances with outdated firing plant. To modernise other machinery, while 'making-do' with inefficient boiler plant is to throw good money down the drain. Modern coal-burning installations can be so efficient that they will more than pay for themselves in a remarkably short time. They are, without question, the *first* essential.

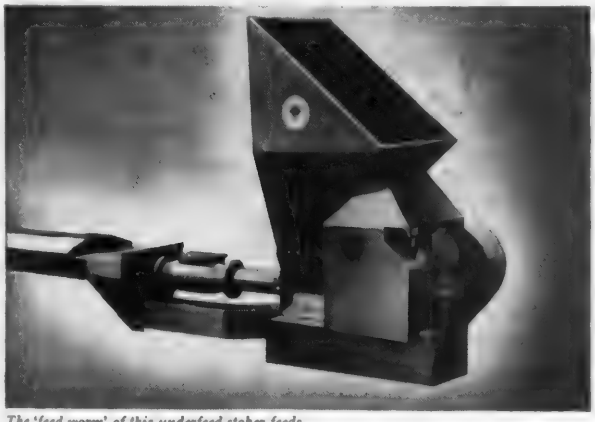
COAL IS THE RELIABLE FUEL

One question for any long-term planning is obvious: can supplies of coal be guaranteed? The answer is yes—without qualification. The mining industry—*Britain's largest single industry* is becoming increasingly efficient; its equipment is the best of its kind. And British coalfields contain enough coal to supply every industrial demand for centuries to come.

COAL IS CLEANER, HOTTER

Modern grading and washing methods ensure that coal is the most efficient and consistent fuel for every type of boiler—the ideal fuel for every section of the food industry.

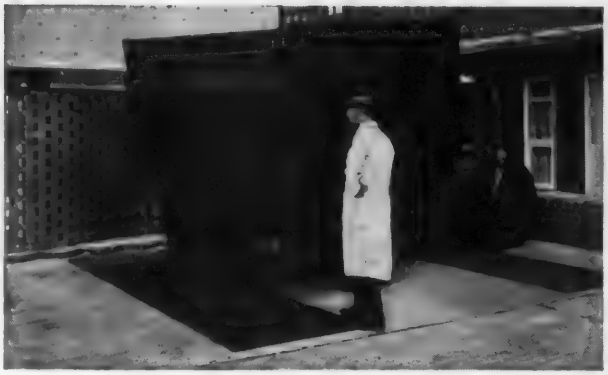
But to obtain the maximum heat at the lowest cost, coal should be mechanically stoked. A mechanical stoker automatically feeds the right amount of coal for the boiler load, even when the load is varying; it burns coal at optimum efficiency all the time without the emission of smoke (thus complying with the regulations in Smoke Control Areas); and it virtually replaces the human element in boiler operation. There are many types of mechanical stokers, of which the most commonly used are the Chain Grate stoker, the Coking stoker, the Underfeed stoker and the Sprinkler stoker. Standard models are available for all sizes of boiler.



The 'feed worm' of this underfeed stoker feeds coal direct from the hopper into a boiler.

OVER 80% OF BRITISH INDUSTRY USES COAL

The National Coal Board is determined that COAL shall continue to be plentiful, shall continue to keep our industrial power both dominant and progressive. You can depend upon COAL: its sources and supply are in our *own* hands—are free from fluctuating foreign policies and stratagems. Endless research by scientists and chemists working in the laboratories of the N.C.B. will ensure that coal will be increasingly profitable for its users.



DELIVERY—ON THE DOT —ON THE SPOT

The delivery of Industrial coal is today organised and completely reliable. Leading coal merchants have completely overhauled delivery and storage systems and are fully equipped to make sure that you get the right grade of coal when you want it and where you want it.

Furthermore, a completely mechanised handling system will transport coal from bunker to furnace without any manual labour at all.

AND—WHEN YOU NEED IT— A NATION-WIDE FREE SERVICE

The vast resources of the National Coal Board are no further away than your telephone. At a flick of your finger, you can call upon one of the most comprehensive and efficient technical services in the world. No problem is too small or too big. You may want advice on coal quality, coal storage, coal-burning appliances or even on the siting of a boilerhouse. Whatever it is, a 'phone call or letter either to your coal supplier or to the Regional office of the National Coal Board will bring an unbiased and authoritative answer to your problem.

FINANCE PLAN FOR INDUSTRY

No deposit, repayments spread over five years, and low interest charges that can be set against tax, full investment and other capital allowances—these are the terms available to the manufacturer or businessman who wants to install modern coal-burning equipment without touching his capital resources.

Make use of the National Coal Board Industrial Finance Plan. The loans are made by Forward Trust Limited, a member of the Midland Bank Group. A 'phone call or a letter to the Regional office of the National Coal Board will bring you full details.

SOLID FUEL—more heat at less cost—and it's British

PROGRESSIVE INDUSTRY IS GOING FORWARD ON COAL

ISSUED BY THE NATIONAL COAL BOARD

OBITER DICTA

● The day of anonymous table birds is over. Housewives have a right to know where their chickens come from—*Press release.*

● The sudden, even explosive development of anchoveta fishing off the coast of Peru—has had world-wide repercussions.—*F.A.O press release.*

● But he has little sympathy for the modern angry young men who, he says, always know where their next meal, however tasteless unless drenched with H.P. sauce, is coming from.—*The Times.*

● The successful candidate . . . would probably have an arts degree, an interest in design, a flair for organising facts. . . Commencing salary £800-£1,000. Free coffee.—*Advertisement quoted in Daily Telegraph.*

● The new . . . soup is not for those who count the calories or like to sip dainty bouillon to prepare the genteel palate for the entree to follow. It is just the thing for husky he-men.—*Press release.*

● A city firm which wrote to an Irish chemical company with an address in Distillery Lane, Dundalk, has had the letter returned by the Post Office. Across the envelope was written: "Firm dissolved." — *Peterborough in Daily Telegraph.*

● I find that many brands of canned apricots, peaches and pears now carry an objectionable flavour of chlorination. I would be interested to hear if other readers share this experience and why this presumably "preservative" addition is necessary.—*Letter in Daily Telegraph.*

● The cake, which was cut by writer Colin Wilson, showed Mr. Miskin in chocolate trousers and an icing-sugar pullover. It took 60 eggs, 6 lb. fat, 7 lb. flour, and 8 lb. icing sugar. . . How did he get the cake safely to London? "On top of my car," he said. "In a coffin." — *The British Baker.*

● There is a restaurant in Paris which specialises in meals for parting lovers. In true Gallic spirit, if one wishes to say goodbye to one's girl-friend, one does not just 'phone her up and say so but takes her to a charming little dinner party and without saying a word, she will understand. Why? Because all the food served is either black or white in colour.—*Press Handout.*

Fourth Philippines' contract

A contract valued at almost 1¼ million dollars for a new flour mill in the Philippines has been placed with Thomas Robinson and Son, Ltd., Rochdale. The new mill is for the Central Philippine Milling Corporation and will be sited at Iligan, near Cebu City. This is the fourth large contract which Robinsons have received from the Philippines since 1958.

John Thompson, Ltd., form new division

A new refrigeration division is being formed by John Thompson (Wolverhampton), Ltd., based on their main factories in Wolverhampton. This division will expand the activity of their South African company, which for some years has been engaged in refrigeration work, among which is a contract with the S.A. government for a large fruit pre-cooling plant of 5,000 tons capacity in Cape Town.

Suspension of canning activities at Ashford

Batchelor's canning activities at their Kent factory will be suspended as from the end of July and future production will be done at the Sheffield factory which will have the effect of freeing the Ashford factory for further expansion in the production of soup mixes and other dried products for home and export markets.

Forthcoming Meeting

S.C.I. Food Group, 14, Belgrave Square, London, S.W.1; Wednesday, May 24, 18.15: annual general meeting, followed by address on "Some Historical Notes on Food Technology" by T. McLachlan.

Allied Oils and Fats, Ltd.

The Edible and Technical Oils and Fats, Feeding Stuffs and Fertiliser business previously carried on by Entwhistle and Bacon, Ltd., has been transferred to a new company, Allied Oils and Fats, Ltd., which has been formed for this purpose.

British Standards for Colouring Matters in Food

Four more British Standards in the series relating to colouring matters in food have been published. They are B.S. 3340 Sunset Yellow FCF; B.S. 3341 Amaranth; B.S. 3342 Ponceau 4R; and B.S. 3343 Carmoisine. They follow the general pattern set by B.S. 3211 Tartrazine, published last year.

Welsh industry's own journal

A monthly journal covering finance and industry in Wales has been published, under the name *The Voice of Welsh Industry*. The price is 1s. 6d. a copy or £1 a year and can be obtained from South Wales Voice Newspapers, Ystalyfera, Swansea, Glamorgan.

Roasters' Guild lunch for trade associations

The Guild of Turning Spit Roasters gave a luncheon in the honour of the Food Manufacturers' Federation, the Cake and Biscuit Alliance and the Cocoa, Chocolate and Confectionery Alliance at the Hotel Montana, Gloucester Road. Each Federation was presented with a diploma in the form of an illuminated scroll recording their contribution to the British buffet in Paris.

Mr. R. Charles Liebman, chancellor of the British Chapter of the Chaine des Rotisseurs, presenting Mr. Burney of the F.M.F. with an illuminated scroll recording the F.M.F.'s contribution to the first World Gastronomic Congress in Paris last December.

PEOPLE

MR. H. E. WHYSALL has been appointed a director of Elkes and Fox, Ltd.

*

MR. J. MERCER has retired from Meredith and Drew, Ltd., after 42 years' service as a salesman.

*

MR. E. VELDEN has resigned from the board of Birds Eye Foods, Ltd.

*

MR. W. FLETCHER has been appointed sales manager, stainless steel plant, of A. Johnson and Co. (London), Ltd. He was formerly with Constructors John Brown, Ltd., as a senior chemical and project engineer.

*

MR. J. BAILLIE has left the Ice-Cream Alliance to take up an executive position in the ice-cream division of J. Lyons and Co., Ltd.

*

MR. F. E. BROADFIELD has resigned from the position of chief engineer of The Energen Foods Co., Ltd., at Ashfield, Kent. Administration of the engineering department has been taken over by MR. J. BANKS.

*

MR. R. H. EDMONDSTONE and MR. L. MASON have resigned from the directorship of Batchelor's Foods, Ltd. MR. A. C. EMMERSON has been elected to the board of directors.

*

PROFESSOR A. C. FRAZER has been appointed to the Agricultural Research Council.

*

MR. S. T. KILLICK has resigned from the position of secretary of the British Baking Industry Research Association to be secretary of the Electrical Research Association. MR. N. CHAMBERLAIN has been appointed head of the newly-formed member services division. Deputy head of the new division is MR. R. A. KNIGHT. MR. T. H. COLLINS has been promoted to the post of senior bakery officer (bread) and MR. J. ROBB has been promoted to the post of senior bakery officer (confectionery).

Mr. H. E. Whysall **Mr. L. B. Sjöström**

MR. B. SJÖSTRÖM has celebrated 25 years of service with Arthur D. Little, Inc.

*

MR. P. B. CULLUM has been appointed sales manager and MR. L. B. HUGHES has been appointed Midland area manager of J. P. Wood and Sons (Poultry), Ltd.

*

MR. O. J. JONES has been appointed as the London and Eastern area representative for Stafford Allen and Sons, Ltd.

Mr. W. J. Ellison **Mr. A. Tomlinson**

MR. W. J. ELLISON has been appointed general manager of Wright Machinery Co., Ltd.

*

MR. A. TOMLINSON has been appointed to the newly-created position of poultry controller of Ross Frozen Foods, Ltd.

*

MR. S. L. ATKINS has been appointed production manager for the Vale of Mowbray Bacon Factory, Ltd.

Mr. P. B. Cullum **Mr. L. B. Hughes**

MR. J. BURWELL, MR. W. HIGGINSON, MISS E. B. HATT and MISS C. OWENSON have recently celebrated 40 years' service with T. Wall and Sons (Ice-Cream), Ltd.

*

MR. E. STOTT, export sales manager of Turner Bros. Asbestos Co., Ltd., has retired after 42 years' service with the company. New export sales manager will be MR. J. C. T. FELL.

Obituary

We regret to record the death in Surrey of MR. HAROLD M. BEAK, late chairman and managing director of Foster Clark, Ltd.

Import Duty Drawbacks Order

The Treasury have made the Import Duty Drawbacks (No. 3) Order, 1961, which, *inter alia*, provides for the allowance of drawback of import duty on specified imported dried white beans used in the production of exported beans canned in tomato sauce or in curry sauce.

International Aerosol Congress and Exhibition

The third international Congress organised by the Federation of European Aerosol Associations will be held from October 4 to 6, 1961, in the Congress House, Lucerne, Switzerland. The first International Aerosol Exhibition will be held during the Congress but will cover two extra days, running from October 4 to 8, 1961, and will be housed in the Kurst-und-Kongresshaus, Lucerne.

Board of Trade visit to Batchelors

Mr. J. H. Osborn, M.P. for Hallam, Sheffield, was received by the Chairman of Batchelors Foods, Ltd., Mr. P. Shirley, at Wadsley Bridge, following a personal letter from the Minister of State for the Board of Trade to the Chairman, complimenting the company on its excellent export achievements during 1960 and proposing that Mr. Osborn, a member of the Board of Trade Export Group, visit the factory to congratulate the staff.

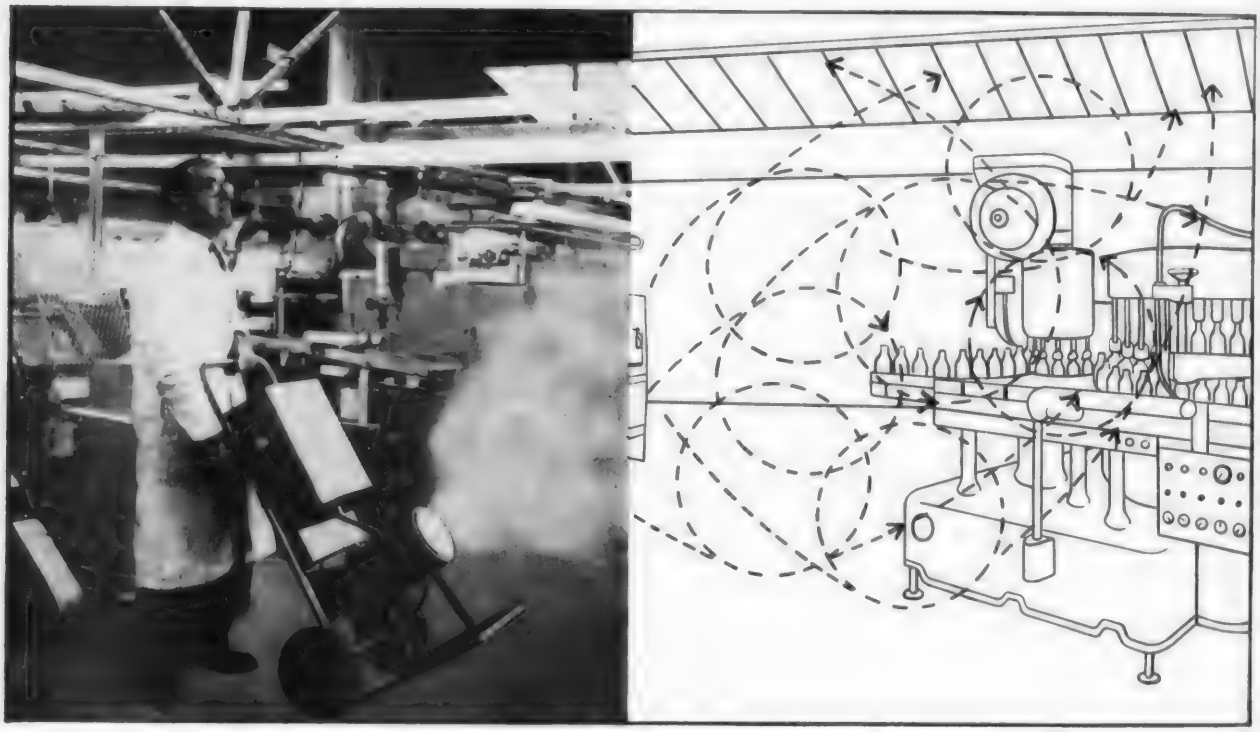
Dr. N. Chamberlain **Mr. J. Robb**

Mr. R. A. Knight **Mr. C. H. Collins**

POSITIVE PEST CONTROL

completed in minutes by FREQUENT FOGGING

using your own equipment and safe insecticides



Disinfestation of manufacturing areas, warehousing, canteens and kitchens has been, until now, a *costly* and *disrupting* business. Today, using MICROSOL, with PYTHON non-tainting, non-toxic insecticides, you can actually carry out the work *without slowing production* or causing inconvenience to your staff.

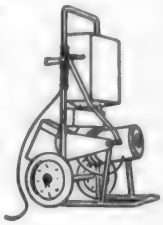
During a break period or last thing at night, one member of your staff operates the Microsol fog generator, filling the whole area with a high-turbulence mist that finds its way onto every exposed surface, and creeps into even the smallest cracks, leaving a thin residual film. PYTHON pyrethrum-based insecticides, well-known for rapid knock-down, complete the process of disinfestation safely, positively and economically. PYTHON is available in a range to cover every purpose.

The job is done in minutes. The capital outlay is negligible and one demonstration is sufficient training for the operator. You can repeat the process as often as you like to suit your own specific needs.

The Microsol mechanical fog generator is available in two sizes:

303T: weighing 75 lb. and wheel-mounted, for complete penetration of areas up to 300,000 cu. ft.

202: weighing 12 lb. and hand-operated, for complete penetration of areas up to 25,000 cu. ft.



Hard to believe? Many leading companies have already proved the positive effect of the Python/Microsol technique.

*MICROSOL mechanical fog generators with *PYTHON insecticides

based on African Pyrethrum

We invite you to see Python/Microsol in action. A technical representative will call with full details, at any time to suit you, and can give an on-the-spot demonstration at your premises.

* *Registered Trade Marks.*

AFRICAN PYRETHRUM

Contact: SILVER CREEK PRECISION LIMITED
17 Willow Road, Poyle Estate, Colnbrook, Bucks
Telephone: Colnbrook 2587/8

A Plea for English Cheese

"When shall we be able to get the good, well matured British Cheddar which we used to get years ago?"

The plea was made in Parliament by Mr. Marcus Lipton, M.P. for Brixton, when he was urging the Food Minister to encourage the production of improved British cheese. Mr. William Vane, the Ministry's Parliamentary Secretary, said that with the encouragement of the department, the industry operated grading schemes for both farmhouse and creamery cheese, including Cheddar. Market prices reflected the gradings obtained so that producers already had an incentive to improve the quality of their cheese.

Mr. Lipton asserted that the higher price ranges of the market were dominated by foreign imported cheeses. Mr. Vane replied that the standards of British cheeses were steadily rising. "Though some people may not think British cheeses compare with some of the imported cheeses, others will say that they are just as good or even better," he declared. "In the end, there is no accounting for taste."

"Doped cotton wool"

It was Mr. Lipton also who inquired whether the Food Minister would now put into effect the recommendations of the Food Standards Committee on bread and flour.

Mr. Christopher Soames said he was considering the many representations he had received on the report. The M.P. then demanded: "When shall we get something better than the doped cotton wool which now passes for bread?" But the Minister declined to accept the implication in that question. He hoped to make a statement "fairly shortly."

Fuss about Members' cream

The quantities of synthetic cream, as distinct from dairy cream, served by the Commons refreshment department brought pointed questions from Members.

They had been told that the average weekly consumption in June, 1960, was seven gallons of dairy and four gallons of synthetic cream, while the corresponding figures for February, 1961, were dairy cream, four gallons and synthetic cream five. One member demanded a reversal of a policy which forced Members to offer agricultural constituents "spurious imitations of agricultural products." Another insisted that whenever "synthetic cream" or "mock milk" were served to Members and their guests this fact should be pointed out to them. But the Chairman of the Kitchen Committee, Sir Herbert Butcher, refused to issue directions about this to the officers of the department.

No curb on bacon imports

Mr. Reginald Maudling, President of the Board of Trade, turned down an M.P.'s request that in order to put the British bacon industry on a permanently satisfactory basis he should explore the possibility of putting a "reasonable limit" on the amount of foreign bacon imported. He said it was the Government's view that Britain's interests were best served by a multilateral system of trade and payments over the widest possible area. Bacon imports from Poland were already limited by quota.

It would be inconsistent with our international obligations to introduce quotas for imports from other main exporters of bacon to the British market—such as Denmark, Holland and Sweden.

Monopolies in the food industry

Among a lengthy list of subjects suggested for reference to the Monopolies Commission in relation to the alleged prevalence of "monopoly" conditions in the supply or processing of goods are biscuits, margarine, milk bottles, the milling industry, molasses, refining of sugar and sugar.

This was stated by the President of the Board of Trade, who explained that the suggestions, which appeared to be within the purview of the Commission but had not been referred to it, were included in the B.O.T.'s annual reports on the operation of the Monopolies and Restrictive Practices Act. The fact that particular goods were mentioned in the reports did not mean that monopolistic or restrictive conditions, as defined in the Act, necessarily prevailed or that, if they did, they were against the public interest. This was for the Commission to determine if a reference was made.

Erections and Extensions

Chicpak, Ltd., are having a poultry packing station erected at Willow Holme, Carlisle, Cumberland.

■

Henry Sprung and Co., Ltd., of Liverpool, are having a factory built for the manufacture of sausage casings at Norwich, Norfolk.

■

Danish Bacon Co., Ltd., are having a distribution depot built at Hereford.

■

J. Ross and Son, food manufacturers, Gloucester Street, Newcastle-on-Tyne, are having a pickle factory built on a site at Scotswood Road, Newcastle-on-Tyne.

■

Caxton Chocolate Co., Ltd., have plans in hand to extend their factory in Mayes Road, London, N.22.

■

Batchelors Foods, Ltd., are having extensions erected to their factory at Ashford, Kent.

■

R. Silcock and Sons, Ltd., are having an animal food factory built at Liverpool.

■

Findus, Ltd., are having a frozen food factory and cold store premises built on a 9-acre site at Grimsby, Lincs.

■

Gabriele Brothers, ice cream wafer manufacturers, of South Shields, are having a factory built on a site at Maxwell Street, South Shields, Co. Durham.

■

Thomas and Evans, Ltd., mineral water manufacturers, of Porth, Glamorgan, are having a branch depot built on a site at Cardiff Road, Watford, Herts.

■

Tyne Brand Products, Ltd., canners and ice manufacturers, are extending their factory at Brewhouse Bank, North Shields, Northumberland.

■

Gray Brothers (Soft Drinks), Ltd., are converting premises into a factory at Simpson Street, Middlesborough, Yorks.

■

Courage and Barclay, Ltd., brewers, are having a bottling factory built at Park Street, Southwark, London, S.E.1.

■

Plans for a new laboratory and pilot plant for **Brown and Polson, Ltd.,** Paisley cornflour manufacturers, have been approved by Paisley Dean of Guild Court. The new laboratory will be a single-storey building and will be erected opposite the firm's existing premises in Paisley.

■

Strathmore Springs, Ltd., and Fergusade, Ltd., acquired some four months ago by Sir Hugh Fraser, are to have a new factory built at Forfar.

■

Work is now in progress for the new **Birds Eye** head office at Walton-on-Thames.

■

Procea Products, Ltd., are extending the bread and flour processes factory at Colnbrook, Bucks.

Number 33 May 1961

The Handling & Storage of L. & N. Products (No. 2)

LODERS and NUCOLINE LTD.

INFORMATION BULLETIN

This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

We offer the following general guide to customers who receive their oils and fats in bulk, or are considering the installation of specially constructed storage tanks.

Refined oils should not normally be held in bulk storage tanks for longer than 7/10 days, or hydrogenated oils for periods longer than two weeks.

Road Tank Wagons

Vehicles are capable of carrying various capacities from 6 to 12½ tons, the latter being the most usual and economic. Some vehicles have two compartments and different types of oil can be carried simultaneously. The largest vehicles are approximately 32 ft. long, 8 ft. wide and 12 ft. high. Since the fully loaded weight may be 22 tons, a hard standing should be provided for the tanker at the intake point.

Fats are normally loaded at our factories at a temperature of 100°—125°F, according to melting point and prevailing climatic conditions. The thermal insulation on the tanker should be sufficient to prevent the fats from solidifying in transit but, if setting up does occur, many tankers are provided with built-in heating coils that can be connected to a local hot water or steam supply.

Intake

The intake point should be on the exterior of the building, protected from the weather and sealed by a screw-cap when not in use. A two-inch steel pipe should be used to deliver the oil into the storage tank and it should carry a two-and-a-half inch male thread for connection to the flexible pipe on the tank wagon.

Tankers are capable of delivering oil up to heights of about 30 ft. and, unless an auxiliary booster pump is available, the top of the storage tank should not be above this height. All pipelines should be installed with sufficient fall to allow easy and complete drainage. Since copper is a strong pro-oxidant, and contact with it will reduce the stability of an oil, the use of bronze fittings, e.g. valves, pump impellers, etc., should be avoided, steel being preferred.

We recommend that fresh oil should be discharged into an empty tank and not mixed with old supplies. When unloading has been completed, the lines should be blown completely free from oil, preferably using the tanker's compressor.

Storage

The tank site should be carefully chosen to minimise the length of pipeline, especially from the tank to the point of use. Tanks should preferably be housed separately away from yeasts or enzyme-carrying dust. Either cylindrical or rectangular tanks are suitable and, whilst a mild steel tank is adequate for most vegetable oils and fats, stainless steel or glass lined tanks may be used to advantage. Tanks should be covered and have dished or similar bottoms to facilitate complete drainage, the take-off pipes being at the lowest point possible. The tanks should be properly lagged and heated so as to avoid localised over-heating. The use of hot water jackets or coils is the most satisfactory. Where it is necessary to use steam, coils are best contained in an air space beneath the tank, and low pressure steam should always be used. An auxiliary thermostatically controlled electric heater may be provided in the air space when steam or hot water are not available. It is desirable to maintain the temperature of the oil in the storage tanks as low as possible, commensurate with keeping the oil completely liquid in the tanks and subsequent pipelines. The delivery pipe should be heated with electrical or steam tracing, and lagged. The tracing should be turned off when the line has been cleared after pumping and turned on again only soon enough to warm the pipe thoroughly before re-using, thus avoiding overheating the small quantities of oil invariably left in the pipe.

Cleaning of Tanks

An accumulation of oxidised oil, pipe scale or other foreign materials in tanks or pipelines may impair the keeping properties of fresh deliveries. Periodic examination of tanks by technical staff should be maintained and, when cleaning is found to be necessary, we recommend that the inside surfaces be completely freed from oil with steam and a suitable detergent. It is most important that the tanks and pipes be thoroughly flushed clean of all traces of detergent, and dried before refilling.

OVERSEAS NEWS

Packaging machinery exhibition in U.S.A.

Nearly 200 American manufacturers of packaging machinery plan to display their products from November 7-10, 1961, in the exhibition building of Detroit.

Colour additive regulations in U.S.A.

In the colour additives amendments to the Federal Food, Drug and Cosmetic Act, regulations give manufacturers information on definition of terms, fees to be charged for listing and certification of batches of colours, labelling requirements for colours, etc.

Nestlé's Brazilian powdered milk plant

Machinery and equipment for the Companhia Industrial e Comercial Brasiliera de Productos Alimentares' new factories is being imported from Britain, U.S.A., Holland, Denmark and Western Germany.

When the new plants, which are situated in Minas Gerais and Sao Paulo, start production, Nestlé will supply more than 80% of the powdered milk consumed in Brazil.

Israeli vegetable dehydration factory

A large vegetable dehydration factory has started operating at a kibbutz near Ashkalon, owned jointly by the kibbutz and Swiss investors. It will process 10,000 tons of 20 kinds of vegetables this year, exporting 95% of the produce.

Ottawa FAO meeting

The economic effects of fishery regulations, a field of study that is rapidly gaining international importance with the increasing size and range of fishing fleets and with the exploitation of the high seas, will be further evaluated at a meeting of experts from June 12-17 at Ottawa, Canada.

Six FAO experts for Africa

Six experts in the field of nutrition or fisheries arrived in Rome for briefing at the Food and Agriculture Organisation headquarters before leaving for assignments in Africa.

Dutch and German sugar interest in Ghana

A party of seven Dutch sugar experts, representing the Sarkara Co. of Holland, are reported to be finalising negotiations with the Ghana government for financing a sugar cane plantation and processing factory at Komenda near Cape Coast. A further party of six experts also arrived in Ghana from the German Democratic Republic to advise on the possible establishment of a sugar beet industry.

Proposed trawler ban creates conflict in Norway

A complex conflict has arisen in Norway in connection with the Government's proposal to extend the fisheries limits. The Government has proposed that only trawlers of less than 300 tons should be allowed to operate between 4-6 miles after the extension comes into force. A/S Findus say that the ban on large trawlers would force a sharp cut in operation of the company's filleting and freezing plant at Hammerfest, now in the midst of major expansion.

New grain slicer produced in Hungary

A grain processing machine which feeds the grains under knives instead of crushing them has been developed in Hungary. The knives cut off the middle part of wheat grains and separate them from the ends, resulting in a more favourable grain size which facilitates milling and processing, and produces a fine, even-grade flour. The barb and the germ ends are then ground together, yielding a flour richer in vitamins.

Suchard's new German factory

Ph. Suchard, G.m.b.H., German subsidiary of the Swiss chocolate manufacturers' recently started up a new plant, doubling output, at Loerrach, Baden.

Shellfish freezing plant in South America

The Societe Brissonneau and Lotz of France has installed a freezing plant for shrimps and shellfish for the Societe Casa Cruz, Nicaragua.

Philippine fresh butter company

Fresh butter is to be manufactured for the first time in the Philippines with the inauguration of Golden State Co., Inc. (Philippines). The new company is an affiliate of Foremost Dairies Inc., of San Francisco.

British canned fruit market saturated, S. Africans warned

South Africa's fruit and vegetable canning industry has been advised to look now to the Continent for fresh markets. The British market, at present taking almost all of South Africa's canned produce, has developed into an extremely discriminating buyers' market during the past two years and local canners face an increasing measure of competition in the virtually saturated U.K. market.

Uganda tea factory project

The Uganda Development Corporation is planning, as part of its expansion plan, the setting up of a soluble tea factory, the first in East Africa on a commercial basis.

Vietnamese dairy farm

Pasteurised milk from the experimental dairy farm at Ben Cat, Vietnam, went on sale in the city as from March.

New milk plant for Malaya

The prime minister of the Federation of Malaya has opened the new milk plant for Beatrice Foods (Malaya), Ltd., the first of its kind in S.E. Asia and the product of joint investment by American and Malayan capital.

New Companies

Rotron Controls, Ltd. (679370.) Century Works, London, S.E.13. To carry on bus. of general engineers, mnfrs. of and dlrs. in flowmetering equipment, etc. £30,000. Dirs.: Geo. C. Fairbanks, Robt. J. Kingsworth and Jacobus C. van Rijn.

Harp Lager, Ltd. (678554.) To carry on bus. of brewers, sellers and distributors of beer, lager, etc. £100. Subs.: R. H. V. Dixon (solr.) and A. G. Staplehurst (clk.).

Askfor and Co., Ltd. (679026.) Savile Street, Hull. To carry on bus. of mnfrs. of and dlrs. in food, etc. £100. Dirs.: Lawrence Denny and Ian M. S. Inglis.

Wick and Co. (Egg Products), Ltd. (679095.) London Bridge House, London Bridge, S.E.1. £1,000. Dirs.: Maurice Wick, Jack Wick, Mark G. Hacker and Louis Berger.

Courtenay and Byrne, Ltd. (679120.) 43, Castle Street, Liverpool, 2. To carry on bus. of mnfrs. of fruit cordials, aerated and mineral waters, etc. £1,000. Dirs.: Roy A. Courtenay, John R. Byrne and Peter Hemmings.

Cheltenham and Hereford Breweries, Ltd. (679166.) £100. Subs.: F. J. Wilson and R. K. Muir (solrs.).

Skerman Developments, Ltd. (679234.) To carry on the bus. of mnfrs. and mchts. of machinery for the confectionery, chemical, cosmetic, bottling, food and allied industries, etc. £100. Dirs.: Diana Tulley and George Seymour.

Payne's (Dairyfresh Products), Ltd. (679367.) 34-8, Shaftesbury Street, Newport, Mon. To take over bus. of mnfrs. of and dlrs. in sausages, cooked meats and meat products of all kinds cd. on as "Ward and Payne" at Newport, Mon. £5,000. Dirs.: Donald G. Payne and Daniel J. Morgan.

Zoppas, Ltd. (679384.) To carry on bus. of food mnfrs., etc. £100. Subs.: Frank Brockley and Mrs. Patricia Ridout.

Purity Food Products (Eastern), Ltd. (679478.) 85, London Wall, London, E.C.2. £100. Subs.: R. Millett and Co., Ltd., Miss Angela R. Boschi and R. Millett and Co., Ltd. (jointly).

Purity Food Products (Northern), Ltd. (679479.) Other particulars similar to Purity Food Products (Eastern), Ltd.

Purity Food Products (Southern), Ltd. (679480.) Other particulars similar to Purity Food Products (Eastern), Ltd.

Purity Food Products (Western), Ltd. (679481.) Other particulars similar to Purity Food Products (Eastern), Ltd.

Hulley's (Frozen Foods), Ltd. (679743.) 179, Cross Hill, Ecclesfield, near Sheffield. £1,000. Dirs.: John Hulley, Frank D. Hulley and Geoffrey K. Hulley.

H. and W. (Meat Products), Ltd. (679818.) 22, London Road North, Lowestoft. To carry on bus. of meat processors, etc. £1,000. Dirs.: Kenneth E. R. Hutson and Richard G. Watson.

Juciful, Ltd. (679835.) 9, Basinghall Street, London, E.C.2. To carry on bus. of mnfrs., bottlers of and dlrs. in aerated, mineral, artificial and natural waters, etc. £100. Subs.: John C. Bowen and Wm. H. F. Norman.

South Coast Ice Cream Confections, Ltd. (680202.) £2,000. Permt. dirs.: Frank Chatham, Alfred Chatham and Frank R. Chatham.

Perfection Steriliser Co., Ltd. (680320.) To carry on bus. of dairy engrs., etc. £500. Dirs.: Fredk. J. Beevis and Edith M. Tattersall.

Rex Foods, Ltd. (680507.) To carry on bus. of pre-packaging and deep freezing of vegetables and farm produce, etc. £10,000. Dirs.: Derek C. H. Crouch, Pamela M. E. Crouch and Rex A. Whittome.

Mack (Middleton), Ltd. (681497.) City Flour Mills, King Street, Norwich. To carry on bus. of bakers, pastrycooks, etc. £100. Dirs.: Lewis H. Read, Bryan C. Read and Stanley W. Sheldon.

Devon and Somerset Egg Packers, Ltd. (681509.) Hort Bridge, Ilminster, Somerset. £60,000. Dirs.: Reginald M. Barnes, David J. Gwyer and Philip J. Langdon.

Bird's Crown Brewery, Ltd. (681531.) The Crown Brewery, Leamore Lane, Leamore, Walsall. £50,000. Permt. dirs.: Norman F. Bird, Mrs. Edith C. Bird and Jas. J. Bird.

R. Simmons (Bakeries), Ltd. (681523.) 867, Forest Road, London, E.17. £1,000. Dirs.: Richard C. Simmons and Hetty L. Simmons.

Cohen Bros. (Oils), Ltd. (681721.) Offices of Conn and Co., Norwich House, Southampton Place, London, W.C.1. To carry on the bus. of mnfrs. of and dlrs. in edible oils and fats. £1,000. Harry A. Gordon and Mrs. Jeannette Gordon.

E. G. Laycock and Co., Ltd. (681725.) 153, Northenden Road, Sale, Cheshire. To carry on bus. of mnfrs. of and dlrs. in sweets, confectionery, tobacco, etc. £1,000. Dirs.: Patrick D. O'Brien, Betty O'Brien and Kathleen A. O'Brien.

Modern Foods (Derby), Ltd. (681738.) £100. Subs.: J. A. Stephens and S. Taylor.

Trent Valley Meats, Ltd. (682087.) Rectory Farm, Beckingham, Lincoln. Canners and pre-packers of meat, etc. Dirs.: J. Sheldon, M. T. Sheldon, R. H. Waddington, W. M. Hare.

Fresh Crush, Ltd. (682143.) 17, Throgmorton Avenue, London, E.C.2. Mfrs. of non-alcoholic fruit beverages, mineral and aerated waters, chemists, druggists, maltsters and brewers. Subs.: M. S. Campbell and M. H. Legge.

H. Williams (Soft Freeze), Ltd. (682190.) Fresh Wharf, High Bridge Road, Barking, Essex. Mfrs. and distributors of ice cream, etc. Dirs.: L. Andres, H. Williams, I. C. R. Williams, D. Facchino.

Ice-Cubes, Ltd. (682345.) 34, Copthall Avenue, London, E.C.2. Mfrs. and dlrs. in ice making, etc. Subs.: N. W. Woodyer, J. M. Carr.

T. and B. (Hargham Road), Ltd. (682483.) Station Road, Attleborough, Norfolk. Millers, etc. Subs.: T. C. Byford, R. W. Harley.

Ever-Sparkle, Ltd. (682900.) 63, West End, March, Cambs. Soft drinks mfrs. Dirs.: F. E. Phillips, F. Phillips.

Tolchard and Son, Ltd. (683250.) Strand Chambers, 8, Strand, Torquay, Devon. Mineral water mfrs. and bottlers. Dirs.: F. T. Tolchard, W. J. Elliott.

Ovaltine Quality Egg Co., Ltd. (683382.) 42, Upper Grosvenor Street, London, W.1. Subs.: J. D. K. Hague, C. Norman, R. Feltwell.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

863,945. CROMBIE, P.: Tea-rolling machines.

863,994. ROSE BROS. (GAINSBOROUGH), LTD.: Formation of end closures in lined cartons.

864,076. LEHNER-STIRNEMANN, M.: Semi-automatic machine for setting up a carton prepared from a foldable blank.

864,083. BELSHAW, T. E.: Portable dough former.

864,090. GENERAL MOTORS CORPORATION: Continuous packaging machines.

864,177. VEDAL, J. M. A.: Method and apparatus for desulphiting fruit juices.

864,185. BAKER PERKINS, LTD.: Making of twist bread.

864,186. BAKER PERKINS, LTD.: Panning devices for loading dough-pieces or the like into tins.

864,187. BAKER PERKINS, LTD.: Devices for rejecting oversized dough-pieces from a moving supply.

865,042. CANADIAN PATENTS AND DEVELOPMENT, LTD.: Removal of radio-active strontium and cesium from milk.

865,191. GUTEHOFFNUNGHÜTTE STERKRADE, A.G.: Roller supports of cane sugar mills.

865,352. S.E.B. SOC. S'EMBOUTISSAGE DE BOURGOGNE: Pressure coffee pot.

865,203. FRISSE MASCHINENFABRIK, R.: Mixing machine for chocolate masses.

865,508. CALIFORNIA PACKING CORP.: Vinegar manufacture.

865,684. CO-OPERATIVE WHOLESALE SOC., LTD.: Biscuit manufacture.

865,839. JOUIS, A.: Machine for tearing muffins, etc.

865,886. SCOTT, J.: Device for tenderising meat.

865,978. ATELIERS DE CONSTRUCTION GUILLAUME OOMS, S.A.: Synchronised mechanism for biscuit manufacturing machines.

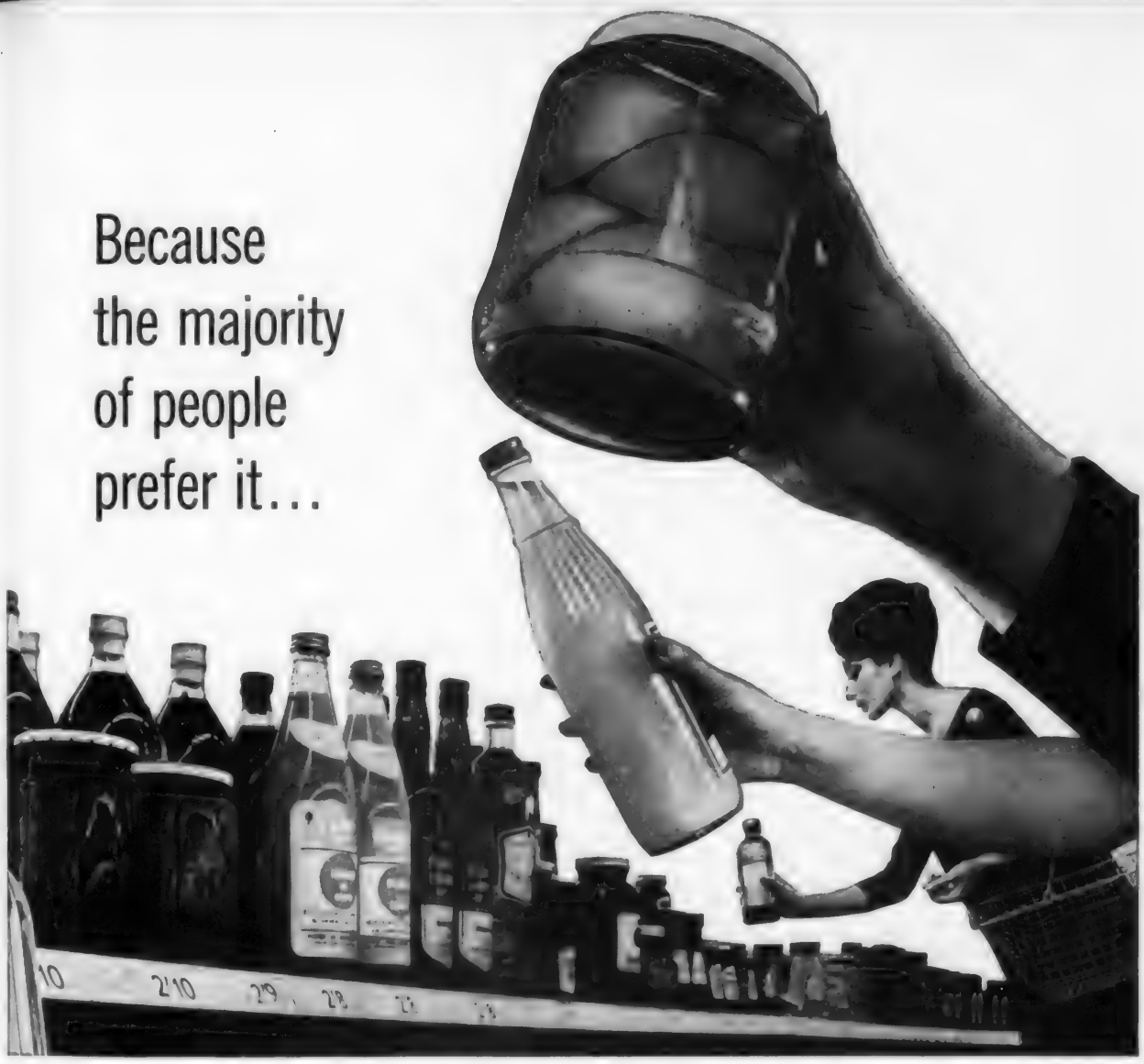
866,093. ROTA, B.: Automatic machine for preparing coffee drinks.

866,138. HEINZERLING, A.: Container cover adapted to separate egg yolk.

866,172. GENERAL FOODS CORP.: Process for preparation of dehydrated potatoes.

866,196. POWELL, T. W. S.: Machine for separating potatoes from soil.

New patents are from the Journal of Patents. Permission to publish has been given by the Controller of Her Majesty's Stationery Office. The publication is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.



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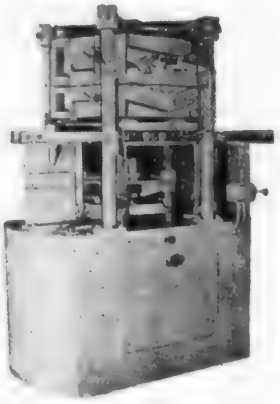

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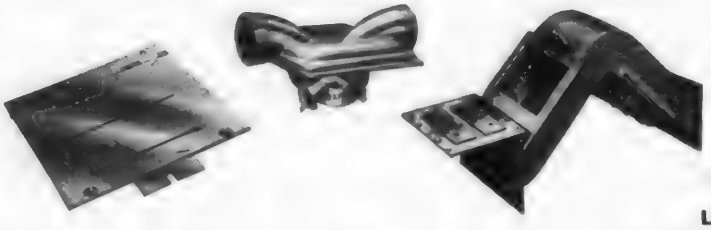

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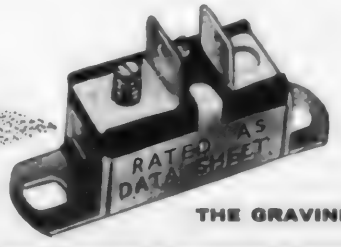

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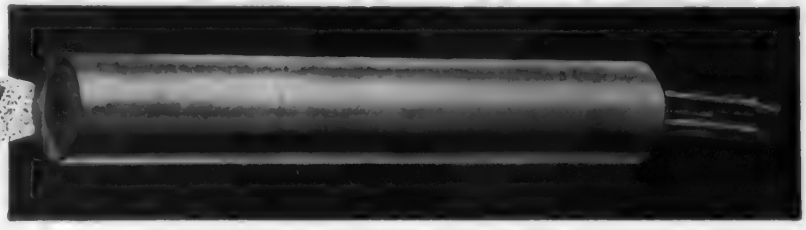

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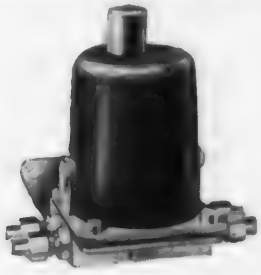

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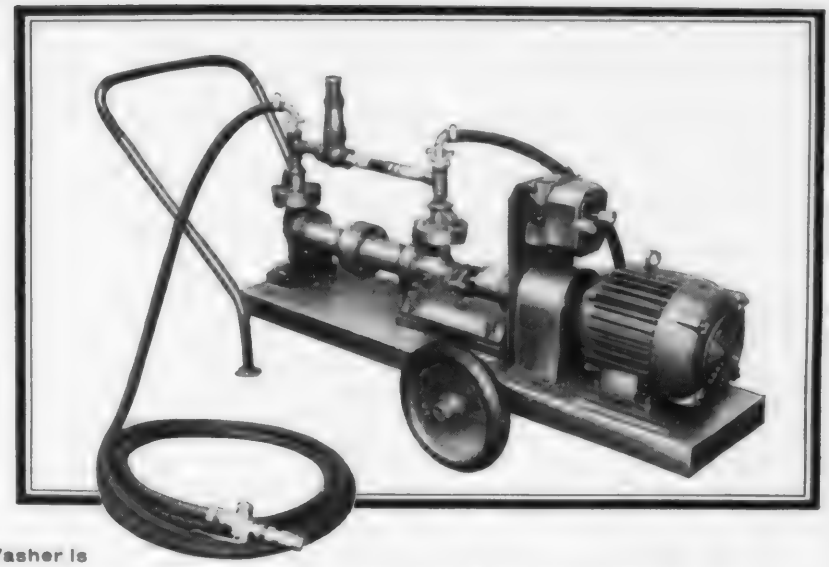

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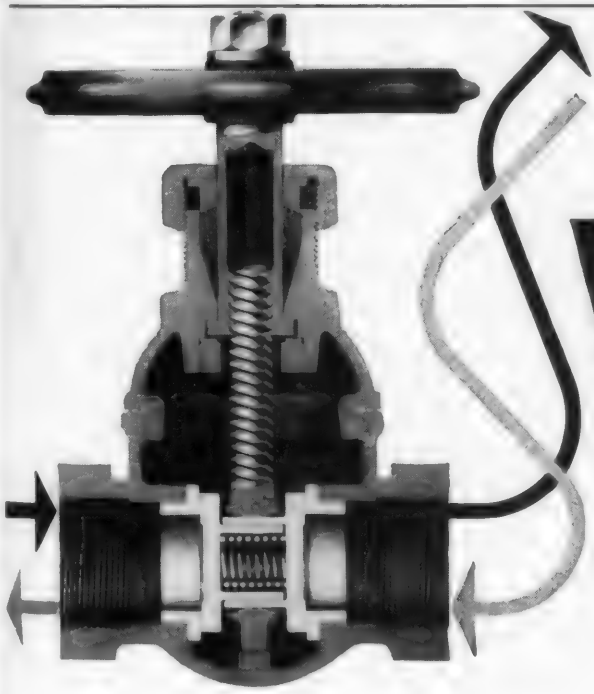

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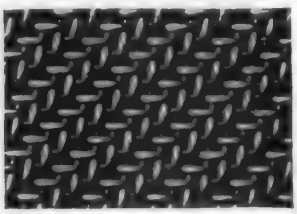

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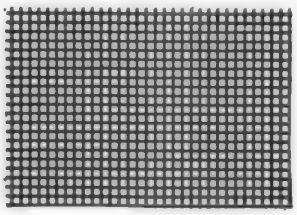

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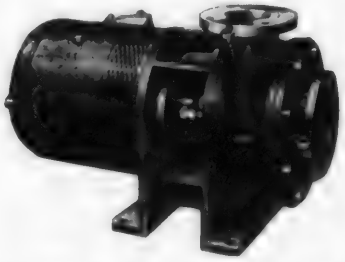

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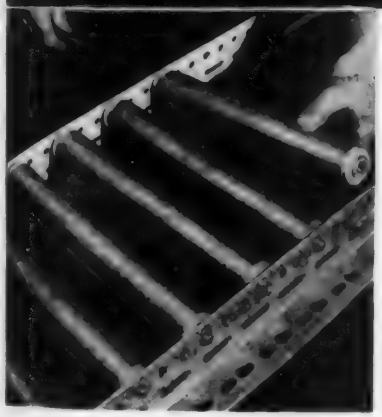

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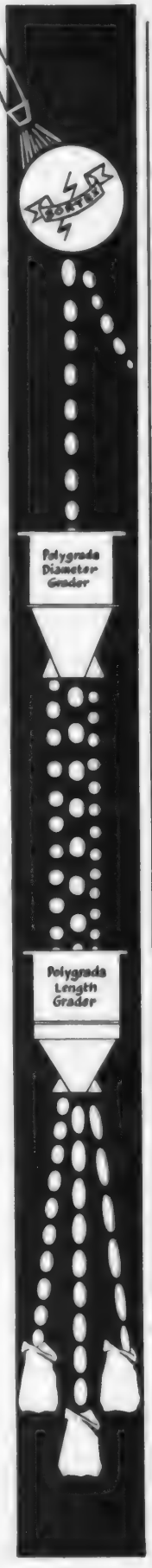
GUM ARABIC, etc.



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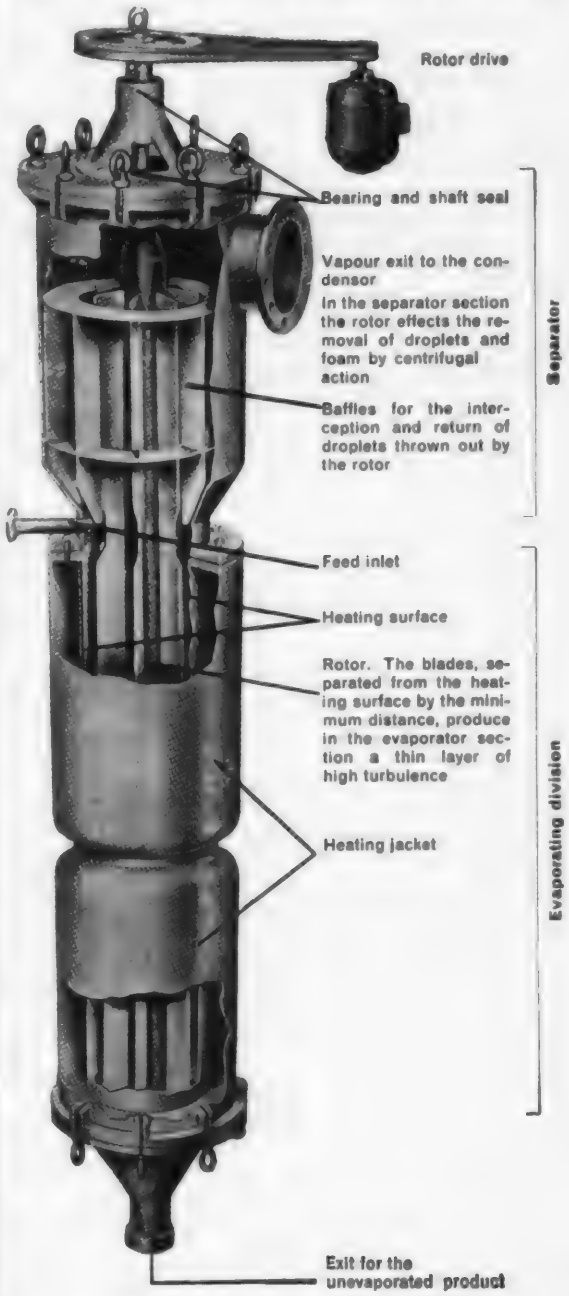
Rotor drive
Bearing and shaft seal
Vapour exit to the condensor
In the separator section the rotor effects the removal of droplets and foam by centrifugal action
Baffles for the interception and return of droplets thrown out by the rotor
Separator
Feed inlet
Heating surface
Rotor. The blades, separated from the heating surface by the minimum distance, produce in the evaporator section a thin layer of high turbulence
Heating jacket
Evaporating division
Exit for the unevaporated product

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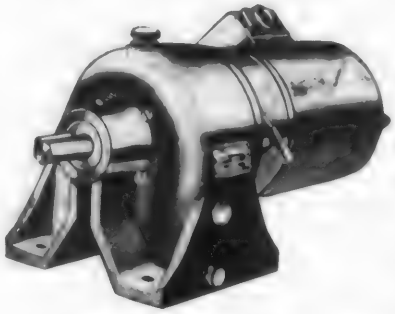

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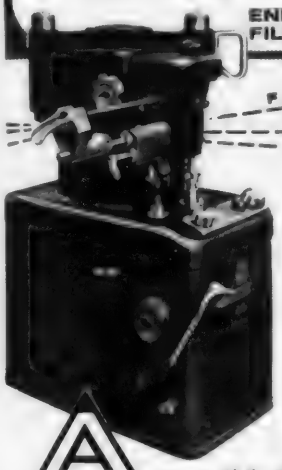

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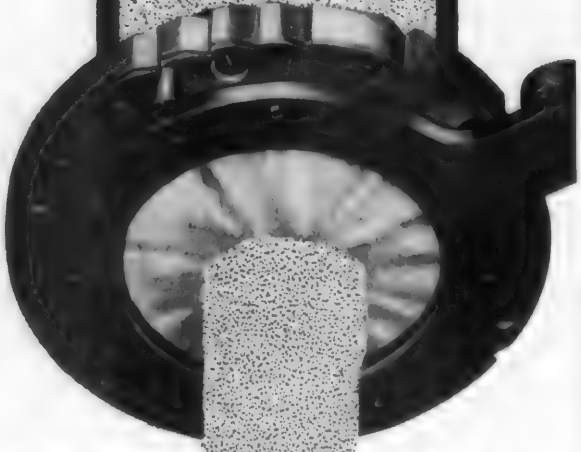

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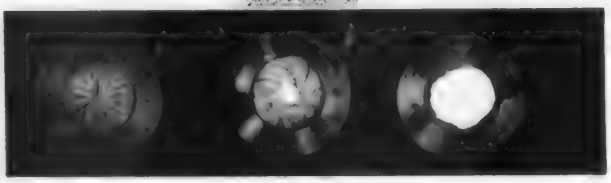

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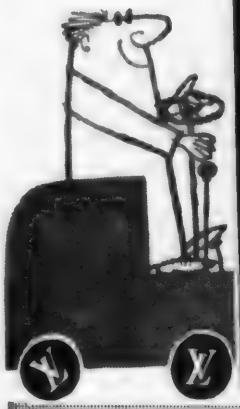

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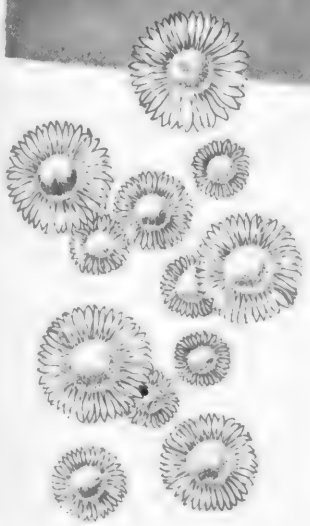

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WANTED "Morton" 30/70 Air Whip Machine Homogeniser 100 gal. per hour, A.P.V. or C.P. All types of equipment applicable to the Ice Cream and Bakery Trades.—Particulars to H. and D. Co., 1, High Street, Minster, Ramsgate, Kent.

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SECOND-HAND redundant food manufacturing machinery for sale:
Can Elevators, stainless steel Trays, Screen, Dicers, Belt Weighers, Colloid Mills, Grinders, complete equipment for Meat and Fish Spread Filling Mixers, Homogenisers, Mincers Barrel Lifter and Pumps.—Box B6049, *Food Manufacture*, 9, Eden Street, N.W.1.

SPENCER Hopwood No. 18 vertical oil-fired Steam Boilers, 2,000 lb. evaporation, 120 lb. pressure with Pumps, Oil Tanks, etc. (2 units). Cochran "Sinuflo" automatic gas-fired Steam Boiler, 760 lb. evaporation, 125 lb. pressure. Gravity Conveyors, rollers, 18 in. and 14 in. wide with Curves and Stands.—Kimmins and Sons Ltd., Lyndhurst Road, Worthing.

"PREMIER Filterpress" Model ES/4 semi-automatic Vacuum Double Seaming Machine for sale. Stationary type with four-roller head. At present fitted with No. 1 vacuum sleeve approximately 4 in. diam. by 8 in. high. With No. 2 vacuum sleeve approximately 6½ in. diam. by 8 in. high. Speeds up to 1,200 cans per hour. Motor drive 400/440/3/50.—F. J. Edwards Ltd., 359, Euston Road, London, N.W.1 or 41, Water Street, Birmingham 3.

STAINLESS Steel Sheets, ex stock, 5 tons, 8 ft. by 4 ft. by 12g EN58J crsd, 6 tons 8ft., by 4 ft. by 14g EN58J crsd.—D. Jenks and Son Ltd., 4 Galen Place, London, W.C.1. Tel.: CHAncery 7851.

FOR Sale or Hire, Forklift Trucks of every description, electric, L. P. gas, and diesel, including side loading carriers, electric reach trucks, etc.—B.G. Plant (Sales Agency) Ltd., Watlington 44 Oxon.

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FORTY enamel-lined cyl. enc. Tanks, 1,000 up to 9,000 gal. S.s. rectangular Tanks, 450 and 850 gal. S.s. jac. cyl. Mixers, 50, 100, 150, 200 and 300 gal. S.s. "Z" Blade Vacuum Mixer, 36 in. by 36 in. by 36 in., 40 h.p. A.C. Two Gardner "U" Trough Mixers, 8 ft. by 3 ft. by 3 ft. 6 in. deep also 5 ft. by 2 ft. by 2 ft., 40 in. by 17 in. by 17 in. and 24 in. by 15 in. by 15 in., etc. Six 40 gal. steel jac. Pans. Two twin roll Dryers, 66 in. by 32 in. diam. Two single roll Dryers, 60 in. by 30 in. diam. 400/3/50. Horiz. Retorts, 6 ft. by 3 ft. by 3 ft., 15 lb. w.p. Vert. cyl. Retorts, 4 ft. 6 in. by 3 ft. 4 in. diam., 25 lb. w.p. Belt Conveyors, 33 ft. by 32 in. and 20 ft. by 30 in. wide. Two s.s. Bucket Elevators, 12 ft. high—21 in. by 16 in. by 10 in. s.s. buckets. S.s. Worm Conveyor, 10 ft. by 5 in. by 5 in. trough. S.s. elec. Bain Maries/Sinks, 4 ft. 6 in. by 3 ft. by 10 in. deep (70 gal.). Three automatic Weighers, 3 lb. capacity. Flour Bagging Machine, 3 lb. bags, 50 doz. p.h. Chocolate Kettles (18), 28 in. by 14 in. up to 38 in. by 18 in. deep. Jac. enamelled Reactor/Mixers, 2 ft. by 2ft., and 2 ft. 6 in. by 2 ft. 8 in. S.s. and m.s. Emulsifiers and Port. Stirrers. Send for Lists.—Harry H. Gardam and Co. Ltd., 100, Church Street, Staines.

CRUMBS! up to one ton per hour from oven fresh bread if required and strictly controlled for size.—Write for details of the Tweedy Impact Granulator to George Tweedy and Co., Ltd., manufacturers of Food Machinery Chipping, Nr. Preston. Tel.: 258/9.

TWEEDY Potato Masher for industrial use is a Smasher! Can be used equally effectively for mashing butter and cooking fats, straight from a cold store if necessary.—Details from George Tweedy and Co., Ltd., Chipping, Nr. Preston. Tel.: 258/9.

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ALWAYS something new for the Food Industry from Tweedy's. A Potato Peeling machine, vertical model, 112 lb. capacity, for the Potato Crisp Trade, Camps and large Canteens. A similar model of the same capacity is now offered for washing potatoes for packaging. Operating time for both (floor to floor) under three minutes.—Details from the manufacturers, George Tweedy and Co., Ltd., Chipping, Nr Preston.. Tel.: 258/9.

BOX NUMBERS—New Service

Please indicate on the envelope containing your application the name of any company you do not wish to contact. Place this envelope in another with appropriate Box Number addressed to Food Manufacture, 9, Eden Street, London, N.1, who will, if the company's name appears, destroy your application unopened.

CANNERY TRADE

We wish to engage a bright young man, under 40, with experience of canning practice to take charge of our small but expanding cannery, which specialises in canned mushroom products. This vacancy offers a future of exceptional opportunity in a business which is continually outgrowing our personnel resources, and the successful applicant will become a Senior Executive within a period which will depend solely on his own drive and progress.

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Young men aged about 30 years and of outstanding ability are offered permanent and progressive posts. Candidates must have reached a high standard of education and had experience in large-scale buying or selling of foodstuffs at first-hand or on the wholesale markets.

Commencing salary will depend upon individual experience with

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Applications, in confidence, giving full details of age, education and experience should be addressed to Box No. B6052, *Food Manufacture*, 9, Eden Street, N.W.1.

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DAMAGED or redundant stocks of food, residues or by-products in large or small quantities required.—Send your offers to Farmers Foods, Co., London Office: 50/52, Blandford Street, W.1. Tel.: Welbeck 8465.

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QUALIFIED Industrial Chemist (Development and Industrial), F.R.I.C., interests include Food Manufacture, would consider joining Company. Capital available.—Box B6046, *Food Manufacture*, 9, Eden Street, N.W.1.

GENERAL SALES Manager considering change would like to discuss proposition involving full responsibility in liason with Managing Director with possibility eventual Director or partnership. Successful, long and mature experience all aspects Food Manufacture, packaging, canning, distribution, transport. Well known to leading buyers throughout U.K., full details at interview.—Box B6041, *Food Manufacture*, 9, Eden Street, N.W.1.

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WORKS Chemist or Food Technologist with experience in chemistry of foods to take charge of laboratory, development of new products, quality control. Bakery experience an advantage. North London.—Application with full details of experience, qualifications and salary required to Box B6047, *Food Manufacture*, 9, Eden Street, N.W.1.

STARCH Room Foreman. Required for factory in London Area East. Two-shift working. £1,150 per annum.—Box B6043, *Food Manufacture*, 9, Eden Street, N.W.1.

TWO Mogul Operators. Required for W. and D. machine, to cover two-shift working. £15 per week. London Area, East.—Box B6044, *Food Manufacture*, 9, Eden Street, N.W.1.

TRAVELLING Salesman, covering England, with established connections food/confectionery manufacturers, already carrying several lines, required to expand sales widely-used raw material. Commission basis only. Car owner essential.—Apply Box B6042, *Food Manufacture*, 9, Eden Street, N.W.1.

ASSISTANT Chemist required for Analytical Laboratory in Food Factory.—Applications, which will be treated in confidence, stating age, qualifications, and salary required, to the General Manager, Marsh and Baxter Ltd., Brierley Hill, Staffs., marked "Laboratory".

WANTED in N.W. London, Male Assistant over 18 years, to train in process control in dairy laboratory.—Apply The Manager, Home Counties Dairies Ltd., 79a, Albert Road, London, N.W.6.

PACKAGING EXPERT

wanted in the Research and Development Department of a large food manufacturing business. Candidates should be preferably under 40, with a good University degree in Chemistry or Engineering, some experience in food packaging and an up-to-date knowledge of plastic materials. The appointment offers a good opportunity to the right candidate.—

Applications stating age, qualifications, experience and salary required to Box B6045, *Food Manufacture*, 9, Eden Street, N.W.1.

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There is a vacancy for a

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A Bright Future for Bright Young People

There are always openings for young people in the many food productive undertakings of the C.W.S.

University Graduates and School Leavers looking for an interesting and rewarding career in the Food Industry should write, telling us about themselves, to:

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1 Balloon Street, Manchester, 4.

YOUNG MEN

of good education, interested in a MANAGEMENT CAREER IN CONFECTIONERY are invited to write for details of our 4 year Management Training Scheme, which includes day-time attendance for City and Guilds Certificate in Sugar Confectionery Manufacture.

Minimum age 19 years.

G.C.E. or equivalent.

Apply to:

Personnel Manager
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Waterden Road, Stratford E.15.

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A leading food manufacturing Company wish to appoint a Chemist to the staff of their new Product Development Gronp.

The Chemist appointed will be concerned with the development of canned products. Candidates aged not over 35 years, must have full knowledge of canning technology. The Company's premises are situated in the West London area.

Applicants are asked to write giving full details of age, education, qualifications and experience to Box No. G.8809 c/o Whites, 72, Fleet Street, London, E.C.4.

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Public school education. Willing to start at the bottom and work upwards.

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PACKAGE FOOD PRODUCTS MANUFACTURING DIVISION

PROJECT ENGINEER

required for long-term development programme. Engineering Degree Diploma and/or A.M.I.Mech.E. and considerable and varied experience in machinery and equipment design and factory layout in the Food industry is essential. Based initially at Manchester the successful applicant will be permanently located elsewhere, the Group's centres being London, Welwyn and Paisley. Applicants should be 28-38 years of age. A good salary, substantial profit sharing scheme, Pension and Life Assurance benefits are all part of the Group's progressive employment policy.

Write Personnel Manager,
Brown / Polson Ltd.,
125, Strand, London, W.C.2.

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The Department of Food Science

QUALITY CONTROL IN THE FOOD INDUSTRY

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The subject matter will include a consideration of methods of organising quality control systems and some of the more important techniques employed in their operation, and tutorial work on set problems will be used to illustrate the principles involved.—Further information and forms of application may be obtained from The Department of Food Science, The Royal College of Science and Technology, 1 Horselethill Road, Glasgow, W.2.

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I.S.I.S. Appointments Register

Licensed annually by the L.C.C.

9, Eden Street, London, N.W.1. EUSton 5911.

I.S.I.S. is an organisation backed by a large industrial group of consultants with contacts in all the industries based on technology. As an addition to their present resources they have established this Appointments Register. Below will be found some of those technologists who are looking for further opportunities. Employers and Personnel Officers are invited to complete the form below, detach and send to the above address. In this particular instance the use of a form, with its attendant simplification of office systems, ensures speedier results for the employer.

Ref. B.320. British. Male. Married. Age 48. 10 yrs. Sales Promoter & 9 yrs. Genl. Manager, toiletries, household chemicals. 6 yrs. Sales Manager, food & chemicals. At present Genl. Manager, household chemicals & other consumer goods—distributor. Languages: German, Dutch, French. Exper. Market Research, pioneering new products, sales campaigns, recruiting & training representatives. Seeks **SALES MANAGEMENT** (Home &/or Export) post. Based on London. £2,000 p.a. min.

Ref. B.267. British. Male. Married. Age 36. B.O.T. (Part A) 2nd Class Cert. 4 yrs. Apprentice Marine Engr., ship owners & repairers. 6 yrs. Junr./2nd Eng. Officer, ship owners. 2½ yrs. Plant Engr., electro-mech. engrs. 7 yrs. Chief Engr., food mnfrs. At present Chief Engr., food mfrs. Seeks post as **LIAISON ENGR.**, London or S.E. England. £1,250/£1,500 p.a.

Ref. B.268. British. Male. Married. Age 31. H.E.T., O.N.C. (Mech). 3 yrs. Toolmaker, aircraft. 2 yrs. Design D/man, contract design office. 2½ yrs. Design D/man, industl. vacuum & conveying. At present Contracts Engr., Design & mnfrs. rotary louvre dryers. Seeks post as **TECHNICAL REPRESENTATIVE.** London. £1,000 p.a.

Ref. B.269. British. Male. Married. Age 37. O.H.C. & H.N.C. (Mech. Eng.) 12 yrs. Armament/Fitter. R.A.F. 5 yrs. D/man. & 2 yrs. Eng. Designer aircraft accessories. At present Engg. Designer, aircraft accessory mnfr. Exper. propellers, fans turbines & associated hydraulic & servo equipt. Seeks post as **ENGG. DESIGNER.** U.K. (not London) or New Zealand. £1,050 p.a.

Ref. B.270. British. Male. Married. Age 29. H.N.C. (Mech. Eng.) with endorsements Theory of structures & Industl. Administration. Grad.I. Struct. Engr. 14 yrs. Apprentice to Senr. D/man, mech. handling engrs. At present Section Leader Design D/man, mech. handling engrs. Seeks post as **TECHNICAL REPRESENTATIVE**, based on Nottingham area.

Ref. B.271. British. Male. Married. Age 36. O.N.C. Mech. Eng. 11 yrs. Clerical work, public transport. 8 yrs. Genl. Asst. Engr., heating research. At present Technical Asst., electric floor warming engrs. Seeks permanent post as **TECHNICAL ASSISTANT INVOLVING TAKING HEAT LOSS CALCULATIONS.** London or Surrey. £1,000 p.a.

Ref. B.272. British. Male. Married. Age 40. O.N.C. & H.N.C. Mech. Engg. with Industl. Administration. A.M.I.Mech.E. 5 yrs. Apprentice, large diesel engines. 4 yrs. D/man, free piston gasifiers. 6 yrs. Designer, hydraulic fuel systems for jet engines. 3 yrs. Chief Designer, small gas turbines & turbine cars. 2 yrs. Senr. Project Designer, advanced power units for commercial transport. At present Assistant Chief Engr., design & devpt. division—gears, gearboxes, motor cars, tractors, m/c tools. Exper. Free Piston Gas Generators, Automatic Transmissions, Marine gearboxes—hydraulics & heavy earth moving equipt. Seeks post as **CHIEF ENGR./ASST. CHIEF ENGR., OR SIMILAR.** U.K.—not N.E. England or Scotland. £2,000 p.a. min.

Ref. B.273. British. Male. Married. Age 38. O.N.C. Chem. O.N.C. & H.N.C. Elect. Eng., Final C. & G. Elect. Eng. A.M.Inst.W.S. 10 yrs. Lab. Asst./Methods Engr. 4 yrs. Head of W.S. Dept., and 1 yr. Prod. Engr., electric lamp mnfr. At present Prod. Engr. plastic & fancy box works. Seeks post as **WORK STUDY ENGR.**—not London—£1,150 p.a.

Ref. B.274. British. Male. Single. Age 23. H.N.C. Mech. Eng. with endorsements. S.M.I.Mech.E. 5 yrs. Apprentice, medium genl. engg. At present D/man, mnfr. air compressors & pneumatic tools. Seeks post as **MECH. ENGR. OR D/MAN.** abroad. £1,100 p.a. approx.

Ref. B.275. British. Male. Married. Age 38. 9 yrs. Apprentice & Motor Engr., retail garage. 5 yrs. Motor Engr., garage. 5 yrs. Engr. i/c of Vehicle Fleet, hospital group garages. At present Superintendent Inspector (Mech.), Mech. Branch of Public Works Dept., abroad. Seeks permanent post as **GARAGE SERVICE MANAGER OR PLANT DEPOT MANAGER.** Abroad. £1,750 p.a.

Ref. B.277. British. Male. Married. Age 28. C. & G. (Workshop). 4 yrs. Foreman, paper mill Engrs. 2 yrs. 3rd Engr., marine engg. 2 yrs. Engr., pump specialist, food m/cy engrs. 2 yrs. with Consultant Engrs. abroad i/c maintenance & m/c shops. Seeks post as **Service Maintenance Engr./Mech. Engr.** abroad. £1,500 p.a.

Ref. B.278. British. Male. Married. Age 30. H.N.C. (Mech. Eng.). 5 yrs. Student/ & 2 yrs. Planning Engr., high speed packing m/cy. 1 yr. Asst. Prod. Controller, m/cy building. 6 mnths. Works Manager, mech. handling equipt. At present Works Manager, mnfr. mech. handling (hydraulic) equipt. Seeks post as **ASSISTANT WORKS MANAGER** with medium/large company. London or 10 mile radius Guildford. £1,600/£1,800 p.a.

Ref. B.279. British. Male. Married. Age 38. O.N.C. & H.N.C., Elect. Eng. & endorsement Radio Eng., Grad. I.E.E. 7 yrs. D/man, power station (elect.). 2 yrs. D/man & 12 yrs. Devpt. Engr., radio transmitters. At present Development Engr.—elec. & Mech.—devpt. of laundry equipt. Knowledge Jig & Tool Design & mech. work. Seeks post as **DEVELOPMENT ENGR.** London or Essex. £1,400 p.a.

Ref. B.280. British. Male. Single. Age 30. H.N.C. (Mech.). Grad.I.Mech.E. 3 yrs. Articled Pupil & 2 yrs. Chassis Design D/man, motor vehicle makers. At present Senr. Design D/man, vehicle mnfrs. Seeks post as **ENGR. OR DESIGNER.** Abroad—not Africa or Middle East—£1,200 p.a. min.

Ref. B.281. British. Male. Married. Age 40. O.N.C. (Elect.)., A.M.I.Inst. Plant Eng., A.M.Inst.B.E. 4 yrs. Apprentice/Junr. Engr., hosiery & textiles. 6 yrs. Chief Elec. Artificer, R.N. 6 mnths. Fitter, brewers & flour millers. 3 yrs. Asst. to Chief Engr., hosiery & textiles. 10 yrs. Maintenance Engr., sawmilling—all wood processing. At present Senr. Maintenance Engr., sawmilling, plymills, wood mnfrs. Exper. preventive maintenance schemes, work study & modern management techniques, costing & toolroom procedure. Seeks post as **MAINTENANCE OR PLANT ENGR.** U.K. £1,500 p.a. min.

Ref. B.282. British. Male. Married. Age 33. O.N.C. (Mech.). 5 yrs. Apprentice, m/c tool mnfr. 1½ yrs. Fitter, tool room, food prod. m/cy. 1 yr. Rate Fixer & 5 yrs. D/man, mnfr. 9 mnths. D/man, diesel engines. At present Section Leader Design. D.O., domestic appliance mnfr. Seeks post as **ENGR. OR ASSIST. CHIEF/CHIEF D/MAN.** U.K.—pref. Home Counties or S. coast England—or Western U.S.A. £1,300/£1,500 p.a.

Ref. B.283. British. Male. Married. Age 34. Cert. equiv. to H.N.C., A.M.I. Plant E. 1½ yrs. Asst. Mech. Engr., oil company. 1 yr. D/man, aircraft mnfrs. 9 yrs. Mech. Engr., civil engg. contractors. At present Mech. Engr., civil engg. contractors. Seeks post as **MECH. ENGR.** London—N. London pref. £1,200 p.a.

Ref. B.259. Irish. Irish. Male. Married. Age 30. Inter B.Sc. & Taking Final Dip. Tech. exam. March. Exper. includes 4 yrs. Laboratory Technician, oil refinery. At present Sandwich Apprentice, oil refinery. Seeks post as **ENGR. B.W.I.** £1,000 p.a.

Ref. B.284. British. Male. Married. Age 47. Diploma in Mech. Engg. 3½ yrs. Steam Engr., engrs. 3 yrs. Turbine Engr., engg. concern. 3½ yrs. Lubrication Engr., & 5 yrs. Tech. Sales Engr., oil company. 1 yr. Senr. Equipt. Engr., oil refinery contractors. At present Senr. Project Engr., oil refinery & steam contractors. Fluent French & German (incldg. Technical), some Italian. Several years exper. in Europe as Sales Engr. Seeks post as **EXPORT SALES ENGR.**, pref. London based with overseas travel. £2,000 p.a. min.

To: I.S.I.S. Appointments Register, 9, Eden Street, London, N.W.1. Please ask the following applicants to communicate with the undersigned:

Ref.:_____	**Ref.:**_____	**Ref.:**_____	**Ref.:**_____
Ref.:_____	**Ref.:**_____	**Ref.:**_____	**Ref.:**_____
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Please use Block capitals

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All introductions are made on the understanding that should an engagement result the employer agrees to I.S.I.S. Appointments Register's terms, which are as follows:

For each person engaged the equivalent of two weeks salary payable by the employer within fourteen days of the date of engagement.

Signature_____ Date_____

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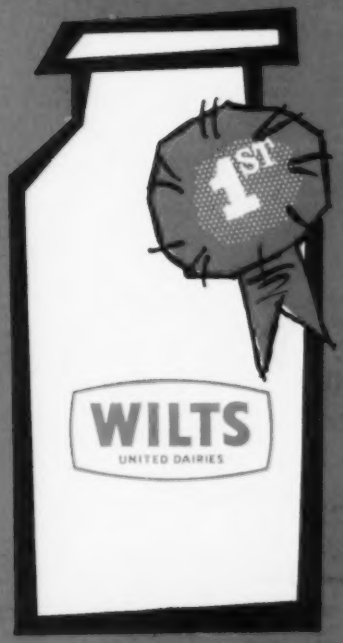

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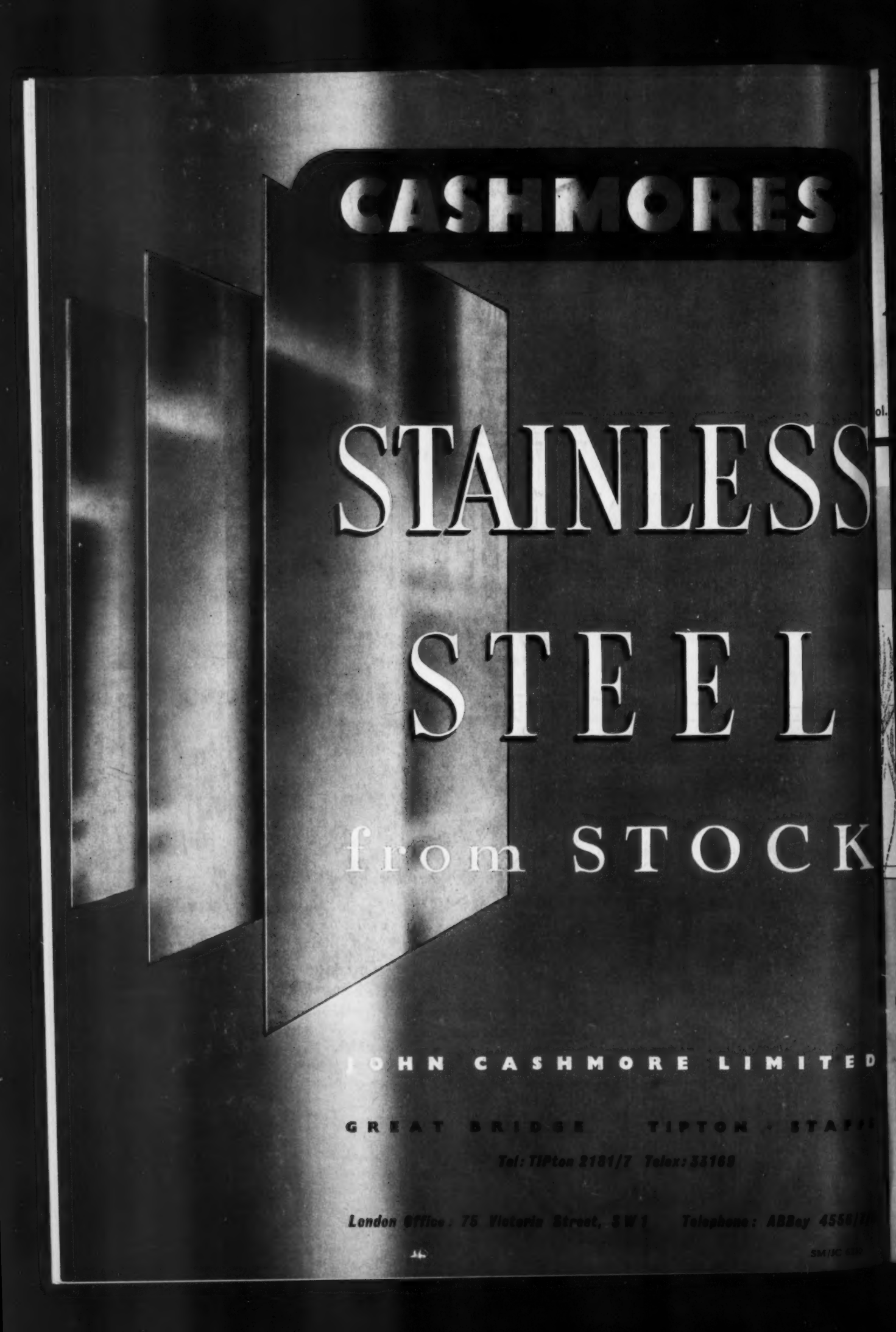
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